U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-291 176

A National Environmental/Energy Workforce Assessment. Post-Secondary Education Profile: Private Sector

National Field Research Center, Inc, Iowa City, IA

Prepared for

Environmental Protection Agency, Washington, DC

Dec 78

PB 291176

Post Secondary Education Profile

PRIVATE SECTOR

Phase II
Of A National Environmental/Energy Workforce Assessment

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC.
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TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.

2.

3. RECIPIENT'S ACCESSION NO. PB291176

4. TITLE AND SUBTITLE
PHASE II OF A NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT — POST SECONDARY EDUCATION PROFILE: PRIVATE SECTOR

5. REPORT DATE December 1978 — date of completion

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
National Field Research Center, Inc.

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
National Field Research Center, Inc.
P.O. Box 287
Iowa City, Iowa 52240

10. PROGRAM ELEMENT NO.
2BC651 (36)

11. CONTRACT/GRANT NO.
Grant # T900591-02

12. SPONSORING AGENCY NAME AND ADDRESS
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

13. TYPE OF REPORT AND PERIOD COVERED
Phase II Final Report

14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This study is one of 16 volumes aggregating data on representative environmental education offerings in the United States at post-secondary education institutions and in the private sector of the economy. Structured around on-site interviews, the study describes the institutions' education programs — their program structure, representative course offerings, faculty structure, and program requirements. In addition, the study provides information on the employment history of graduates.

Designed as Phase II of a three-phase program, the study presents the information on schools in the following volumes: two volumes on potable water and two on wastewater; one volume each on air, noise, pesticides, radiation, solid waste and energy; a two-volume composite report on environmental engineering/health; a one-volume report on education/ecology; and a volume on some training programs conducted by businesses and by trade and professional associations. In addition, the study includes a one-volume abstract and a one-volume summary. The study is an overview. It doesn't include all environmental programs in the United States, and it makes no attempt to evaluate the program offerings.

Phase I of the study assessed the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Phase III, which will be available in September 1979, will offer recommendations, curriculum changes, and modifications that appear necessary to assure a properly trained national environmental workforce

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution	Environmental Engineering	National Environmental/Energy Workforce Assessment	
Water Pollution	Environmental Health		
Solid Wastes	Environmental Education		
Potable Water	Environmental Protection		
Pesticides	Pollution Control		
Radiation	Instruction		
Noise Pollution	Schools		
Energy	Education		
Manpower	Ecology		

18. DISTRIBUTION STATEMENT
Release unlimited

19. SECURITY CLASS *(This Report)*

20. SECURITY CLASS *(This page)*

21. NO. OF PAGES 217

22. PRICE PC-A10/MF-A01

EPA Form 2220-1 (9-73)

BUSINESS & INDUSTRY
AND
TRADE & PROFESSIONAL
ASSOCIATIONS

EDUCATION AND TRAINING PROFILE

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC.

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591

1978

This document has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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INTRODUCTORY NOTE

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TABLE OF CONTENTS

Page

TABLES. iv

ACKNOWLEDGEMENT v

FOREWORD. vi

BUSINESS & INDUSTRY and TRADE & PROFESSIONAL SUMMARY. vii

PROJECT BACKGROUND. 1

INTRODUCTION. 7

PICTURE PROFILE 13

PROJECT FINDINGS. 25

I. Alphabetical List of Program Summaries 27

II. List of Programs by Environmental Category 33

III. A Summary Profile of Training Programs 41

Air - Table 1. 44
Composite - Table 2. 46
Energy - Table 3. 52
Noise - Table 4. 56
Pesticides - Table 5. 60
Potable Water - Table 6. 62
Radiation - Table 7. 68
Solid Waste - Table 8. 72
Wastewater - Table 9. 74

IV. Training Program Summaries 79

PROJECT COMMENTARY. 215

APPENDICES. 223

I. Participating Organizations. 225

II. Organizations Contacted. 233

DOCUMENT COMPLETE - PAGINATION PER SOURCE

TABLES

Table	Title	Page
1	A Summary Profile of Air Training Programs.	44
2	A Summary Profile of Composite Training Programs. . . .	46
3	A Summary Profile of Energy Training Programs	52
4	A Summary Profile of Noise Training Programs.	56
5	A Summary Profile of Pesticides Training Programs . . .	60
6	A Summary Profile of Potable Water Training Programs. .	62
7	A Summary Profile of Radiation Training Programs. . . .	68
8	A Summary Profile of Solid Waste Training Programs. . .	72
9	A Summary Profile of Wastewater Training Programs . . .	74

ACKNOWLEDGEMENT

Appreciation is expressed to the many individuals from the private sector who responded to the initial request for information on training. The contact persons listed in each of the program summaries are especially notable because of their additional contributions of time and materials. These individuals not only provided the valuable information for the program summaries but reviewed the final drafts prior to publication. Without the interest and cooperation of all the responding organizations in the private sector, such a survey could not have been done.

Special thanks also go to those persons within the United States Environmental Protection Agency who provided guidance and direction throughout the term of the project. Foremost are Mr. Peter D. Cook, Mr. Joseph McCabe, Mr. J. Donald Cook and Mr. Michael Moore, all of the EPA Office of Federal Activities.

Those organizations who contributed the photographs used in this report also deserve special mention. In many cases, photographs were duplicated and reduced by the contributing organization expressly for this report.

An extra thank you to Mr. John P. Bachner, Executive Secretary of the National Council of Acoustical Consultants, who forwarded copies of the initial inquiry, at his own expense, to each member of the Council so that they might all have the opportunity to participate.

FOREWORD

Information for this report was compiled largely from materials received from the responding organizations. These materials included actual training manuals, brochures, scripts, speeches, press releases, course descriptions, conference proceedings, lists of audio visual training aids, course texts, employee materials, correspondence course materials and association course catalogs. In all cases, telephone contact supplemented the written information. Draft summaries were mailed to the contact person for validation. In several cases, due to proximity, on-site interviews were completed.

This report presents the summaries of training efforts in this sample of private sector related to pollution control and abatement. Of interest were the following environmental areas: air, energy, noise, pesticides, potable water, radiation, solid waste and wastewater.

This study was carried out for the United States Environmental Protection Agency by the National Field Research Center, Inc. of Iowa City, Iowa with field offices located in Atlanta, Georgia; Denver, Colorado; and Washington, D.C.

NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT

PHASE II

POST-SECONDARY EDUCATION PROFILE

BUSINESS & INDUSTRY
AND
TRADE & PROFESSIONAL ASSOCIATIONS

SUMMARY

BUSINESS AND INDUSTRY

TRADE AND PROFESSIONAL ASSOCIATIONS

This portion of the National Environmental/Energy Workforce Assessment describes 64 training programs related to pollution control and abatement, environmental research and resource conservation. The organizations included in this survey represent a variety of businesses, trade and professional associations. In addition, several institutions of higher education are included due to their unique training components. The eight environmental areas surveyed were air, energy, noise, pesticides, potable water, radiation, solid waste and wastewater.

A. A VARIETY OF RESPONSES

A wide variety of organizations responded to this survey including major oil companies, noise consulting/training firms, utility companies, major manufacturers and numerous types of associations. The training done by such a diverse group varies greatly in format, presentation, and, of course, content and scope. A selection of the types of courses and their presentation provide an overview of the more detailed information included in the Report itself. Courses in the private sector include:

-- Seminars conducted in-house which can include workbooks, pre and post tests, and users' manuals like those at Chevron and Pratt Whitney.

-- In-house campaigns using posters, buttons, pamphlets, newsletters and films such as the 3M (Minnesota Mining

Preceding page blank

and Manufacturing) programs and Scott Paper's Project DIET.

-- Workshops and meetings prior to or during annual membership conventions, such as the Atomic Industrial Forum, Inc. program and the Institute of Noise Control Engineering.

-- Computer modelling programs for noise used in plants and in communities, such as Chevron's.

-- Audio visual training utilizing slides, sound filmstrips, tapes and videotapes such as those produced by the American Chemical Society, NCASI (National Council of the Paper Industry for Air and Stream Improvement) and ADRA (Automotive Dismantlers and Recyclers of America).

-- Correspondence courses such as those provided by the National Water Well Association.

-- Unique Career Development and motivational programs such as the one designed by the Environmental Management Association.

-- Seminars designed for high school students highlighting conservation and environmental awareness conducted by the Arkansas Power and Light Company annually to over 10,000 students.

-- Emergency preparedness seminars and procedures developed by Duquesne Light Company.

-- A wide variety of workshops developed primarily for the membership in associations such as the Portland

Cement Association and the American Public Works Association.

This list includes a few of the interesting and innovative approaches to training sampled in the private sector. The actual program summaries included in the Report provide additional content information and the necessary detail.

In addition to the varied program content and scope, these training programs differed with regard to several variables:

- -- length of program--from several hours to several weeks;
- -- number of participants--from a few to 10,000 annually;
- -- types of media used; types of instructional materials used; instructional methods employed;
- -- participation awards--CEUs (Continuing Education Units); college credits; certificates.

Each of these variables is described in table form within the Report, for each training program included.

B. A TRAINING PROGRAM DEFINED

Obviously, the term training program used in this context is defined quite broadly due to the variety of organizations surveyed. Certain criteria, however, did have to be met in order for an organization's training program to be included. These criteria were:

1) The materials associated with the training effort had to be either printed or audio visual. If the program was so informal that no written materials were available describing the content, it could not be summarized for the Report.

2) On-the-job training was included only if it was a formal training program, that is, had some accompanying written or audio visual materials.

3) Training had to be related in some way to one of the eight environmental areas being surveyed: air, energy, noise, pesticides, potable water, radiation, solid waste and wastewater.

4) Training related to energy conservation or resource conservation was considered a viable program for this Report.

One or more of these criteria had to be met in order for a program to be included in the Report.

C. THE OBJECTIVES AND THE PROCESS

The objectives as outlined for this portion of the National Environmental/Energy Workforce Assessment are multiple and broadly stated:

1) To solicit responses from the private sector describing their environmentally related training efforts, in order to answer the basic questions of 'who' and 'what kind' of training is being done.

2) To describe these training efforts in brief summary form in order to determine how, with what types of materials and in what depth are people being trained in the private sector.

3) To seek training programs in all eight environmental areas which provide the focus for this entire Report.

4) To provide primary source data on the relationship between academic training in environmental fields and subsequent employment of graduates in those fields.

In order to accomplish these objectives, the following steps were taken.

- An initial mailing of 375 letters was sent to various businesses, trade and professional associations.
- The organizations responding in the affirmative, that is, they conduct some training related to one or more of the environmental areas listed in the letter, were telephoned and asked specific questions about their training efforts.
- Materials describing the training or actual training materials were sent by the organizations for review and summarization.
- A draft of the program summary describing the organization's training efforts was sent back to the organization for approval prior to publication.

- -- Final program summaries incorporate comments and changes suggested by the organizations.

The process described above generally applies to the organizations included in the Report. However, in some cases, on-site visits were made to the organizations' offices and training center.

D. THE RESULTS

The overall response rate to the initial letter was 33 percent for both businesses and trade and professional associations combined. The association response was somewhat greater, 41 percent, than the response from businesses, 28 percent. These responses resulted in the 64 training program descriptions included in the Report. The programs represent a sample of the types of training being conducted in the private sector and while this sample is small it provides very specific information about such training efforts:

- -- "Training" encompasses specific skills and information, environmental awareness, global issues, resource conservation, health hazards, computer modelling, emergency preparedness, current environmental issues and regulations as well as new technology.

- -- The recipients of this training are primarily employed by the private sector but in some cases include high school students, public sector employees and the community at large.

- -- The cost of this training is borne by the private sector.

-- The training programs were developed because of a specific need whether the passage of new legislation, the discovery/invention of new technology, a need for conservation or to reduce the risk of pollution.

-- Training or retraining by the private sector versus academic training in environmental fields is the subject of much debate and varying opinions. The controversy over the preparation of individuals for environmentally related positions may be industry-specific but needs further investigation.

A great deal remains to be learned about training in the private sector. This sample attempts to answer some basic questions and in the course raises more questions.

PROJECT BACKGROUND

Photo reprinted from the University of Wisconsin,
Madison Oceanography and Limnology Catalog

PROJECT BACKGROUND

OVERVIEW:

In late 1975, Congress acknowledged the growing national concern for the preservation and conservation of our national resources with a direct inquiry into the availability and readiness of our environmental workforce. That inquiry has taken the form of a three-year, three-phase National Environmental/Energy Workforce Assessment, currently being conducted by National Field Research Center under the direction of the U.S. Environmental Protection Agency. In keeping with the objective of the assessment, this three-phase national effort directs itself at environmental/energy workforce needs, national educational preparedness, and the functional relationship between the two.

PHASE I:

Phase I of the National Environmental/Energy Workforce Assessment focused upon the development of "workforce demand projections" through 1982 for all public environmental agencies. This on-site assessment, which was carried out in all 50 states, Puerto Rico and the Virgin Islands, culminated in a numerical profile of the growth patterns and workforce needs at the national and state levels. Stratification of the overall definition of "environmental occupation" into seven distinct vocational areas enhanced even further the applicability of the results. In addition to this public sector workforce assessment, Phase I included an overview analysis of private sector needs (through an adjunct mail survey of selected businesses and industries) and a brief review of selected environmental educational programs.

Phase I was completed in May, 1977. The 70-volume final report included:

* National Abstract	(1)
* National Legislation	(1)
* Regional Assessments	(10)
* State Assessments (including D.C., VI and PR)	(53)
* Business and Industry Assessment	(1)
* National Summary	(4)

The major emphasis of Phase II of the National Environmental/Energy Workforce Assessment was structured around an intensive on-site inventory of representative environmental educational offerings on a national scale. The primary objective of this project has been to collect and aggregate data on training and educational programs in both the post-secondary education field and in the private sector and to do so by environmental area. Specifically, the study was designed to provide an overview of environmentally related post-secondary education programs, their program structure, representative course offerings, employment history of the graduates, and the faculty structure. Additionally, information was to be collected on program requirements and program projections.

REPORT ORGANIZATION:

The final report, of which this volume is a part, consists of 16 volumes depicting a training profile in each medium under consideration, namely:

Air
Energy
Noise
Pesticides
Potable Water (2)
Radiation
Solid Waste
Wastewater (2)
Composite (3)
Business & Industry and Trade & Professional Associations
Summary
Abstract

The basic intent of this, the private sector portion of the report, was to sample private sector training programs related to pollution control and abatement, environmental research and resource conservation. The organizations included in the survey represent a variety of businesses, industries, and trade and professional associations. The data gathered give an overall view of representative training programs currently conducted in a wide variety of organizations. The Introduction describes the sample selection and data gathering processes.

Photo reprinted from the University of Missouri, Columbia Bulletin 1977.

INTRODUCTION

Photo reprinted from the Northland College Catalog 1975-76

INTRODUCTION

This report describes sixty-four training programs related to pollution control and abatement, environmental research and resource conservation. The organizations included in this survey represent a variety of businesses, trade and professional associaitons. The eight environmental areas surveyed were air, energy, noise, pesticides, potable water, radiation, solid waste and wastewater.

The objectives envisioned for this portion of the National Environmental/Energy Workforce Assessment were multiple and broadly stated:

1) To solicit responses from the private sector describing their environmentally related training efforts, in order to answer the basic questions of "who" and "what kind" of training is being done.
2) To describe these training efforts in brief summary form in order to determine how, with what types of materials and in what depth are people being trained in the private sector.
3) To seek training programs in all eight environmental areas which provide the focus for this entire report.
4) To provide primary source data on the relationship between academic training in environmental fields and subsequent employment of graduates in those fields.

In order to accomplish these objectives, the following steps were taken. This brief summary description will be expanded in later sections.

- An initial mailing of 375 letters was sent to various businesses, trade and professional associations.
- The organizations responding in the affirmative, that is, they conduct some training related to one or more of the environmental areas listed in the letter, were telephoned and asked specific questions about their training efforts.

- Materials and/or actual training materials were sent by the organizations for review and summarization.
- A draft of the program summary describing the organization's training efforts was sent back to the organization for approval prior to publication.
- Final program summaries incorporate the comments and changes suggested by the organization.

The process described above generally applies to the organizations included in this report. However, in some cases, on-site visits were made to organizations' offices and training centers.

The basic intent in this survey is simply to sample private sector training efforts. Therefore, the actual numbers of organizations contacted and subsequently included in this report are small. They are not meant to be comprehensive and should not be construed as all-inclusive or even necessarily representative, either of industries, associations, training programs or environmental categories. Generally speaking, the response rates were rather encouraging especially when reviewed as having been generated by a single letter. The data gathered gives an overall view of sample training programs currently being conducted by a wide variety of organizations.

Initially, letters were sent to 229 businesses in the following industries: paper, chemicals, oil, steel, airlines, utilities, coal, cement manufacturing and general manufacturing. Those companies most likely to be involved in pollution control activities of the Fortune 100 were included in this initial mailing as well. A sample of 146 trade and professional associations also received the initial inquiry asking for information about training activities. A complete list of organizations to whom letters were sent is included in the Appendices.

The overall response rate was 33% from both businesses and trade/professional associations, or 123 responses from the initial mailing of 375 letters. The trade and professional associations had a response rate of 41%, or 60 responses from 146 letters. The business response rate was 28% or 63 responses from 229 letters. All of the organizations responding to the initial letter are included in this report: either in the Program Summaries, if the organization described their training efforts; or in the Appendices, if they responded saying they have no pollution-related training. Since the intent of this report is simply to sample private sector training efforts, the results included herein cannot be considered comprehensive or all-inclusive.

The term, training program, used in this report is defined rather broadly. However, in order to be included, an organization's training program had to meet one or more of the following criteria:

1) The materials associated with the training effort had to be either printed or audio visual. If the program was so informal that no written material existed describing the content, it could not be summarized for this report.

2) On-the-job training was included only if it were a formal training program, that is, it had some accompanying written materials.

3) Training had to be related in some way to one of the eight environmental areas being surveyed: air, energy, noise, pesticides, potable water, radiation, solid waste and wastewater.

4) Training related to energy or resource conservation was considered a viable program.

A wide variety of organizations responded to this survey including major oil companies, noise consulting/training firms, utility companies, major manufacturers and numerous types of associations. The training done by such a diverse group varies greatly in format, presentation, and, of course, content and scope. A selection of the types of courses and their presentation will provide a preview of the actual program summaries. Courses include:

- Seminars conducted in-house which can include workbooks, pre and post tests, modules and users' manuals like those at Chevron and Pratt Whitney.
- In-house campaigns using posters, buttons, pamphlets, newsletters and films such as the 3M programs and Scott Paper's Project DIET.
- Workshops and meetings prior to or during annual membership conventions. See the Atomic Industrial Forum, Inc. program and the Institute of Noise Control Engineering.
- Computer modelling programs for noise such as Chevron's used in plants and in communities.
- Audio visual training utilizing slides, sound filmstrips, tapes and videotapes as described in the American Chemical Society and NCASI summaries.
- Correspondence courses such as the National Water Well Association.
- Unique career development and motivational programs such as the one designed by the Environmental Management Association.

These courses include a few of the interesting and innovative approaches to training sampled in the private sector. A review of the program summaries will provide additional approaches and the necessary detail.

The photographic tour which follows is designed to illustrate the spectrum of activities, people, methods and materials to be encountered during the review of private sector training programs.

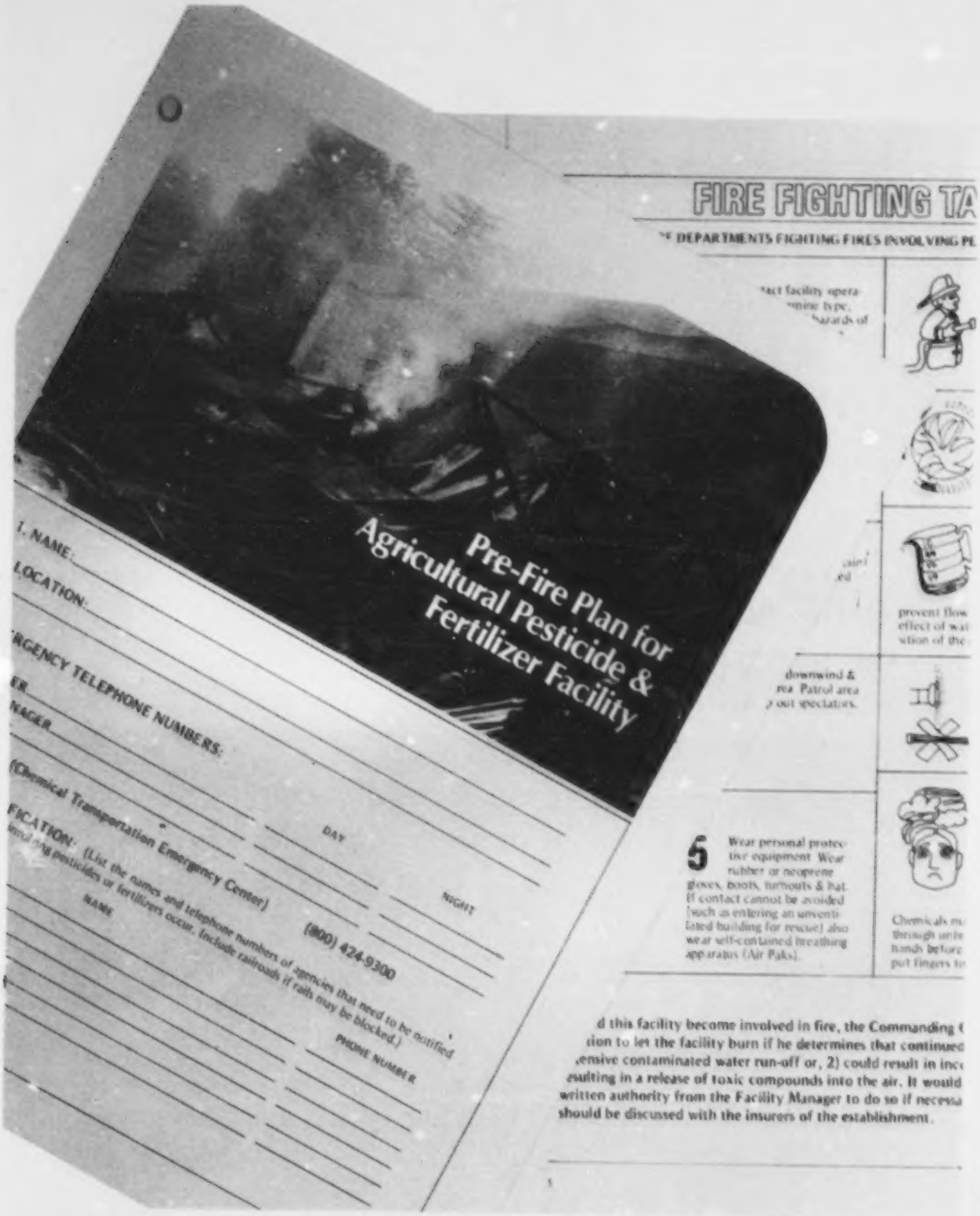
PICTURE PROFILE

A Visual Trip Through Some Training Programs . . .

ON FILM:

Portland Cement Association utilizes sophisticated media technology for training at the 40-acre campus of the Cement and Concrete Center in Skokie, Illinois. Participants view the video tapes following the sessions as a means of either review or self-evaluation.

AND ON FIRE:



Pre-Fire Plan for Agricultural Pesticide & Fertilizer Facility

1. NAME:
LOCATION:
RGENCY TELEPHONE NUMBERS:
ER
NAGER
DAY
NIGHT
(Chemical Transportation Emergency Center) (800) 424-9300
FICATION: (List the names and telephone numbers of agencies that need to be notified
lving pesticides or fertilizers occur. Include railroads if rails may be blocked.)
NAME
PHONE NUMBER

FIRE FIGHTING TA

DEPARTMENTS FIGHTING FIRES INVOLVING PE

act facility opera-
mine type,
hazards of

prevent flow
effect of wat
ation of the

downwind &
rea. Patrol area
p out spectators.

5 Wear personal protective equipment. Wear rubber or neoprene gloves, boots, turnouts & hat. If contact cannot be avoided (such as entering an unventilated building for rescue) also wear self-contained breathing apparatus (Air Paks).

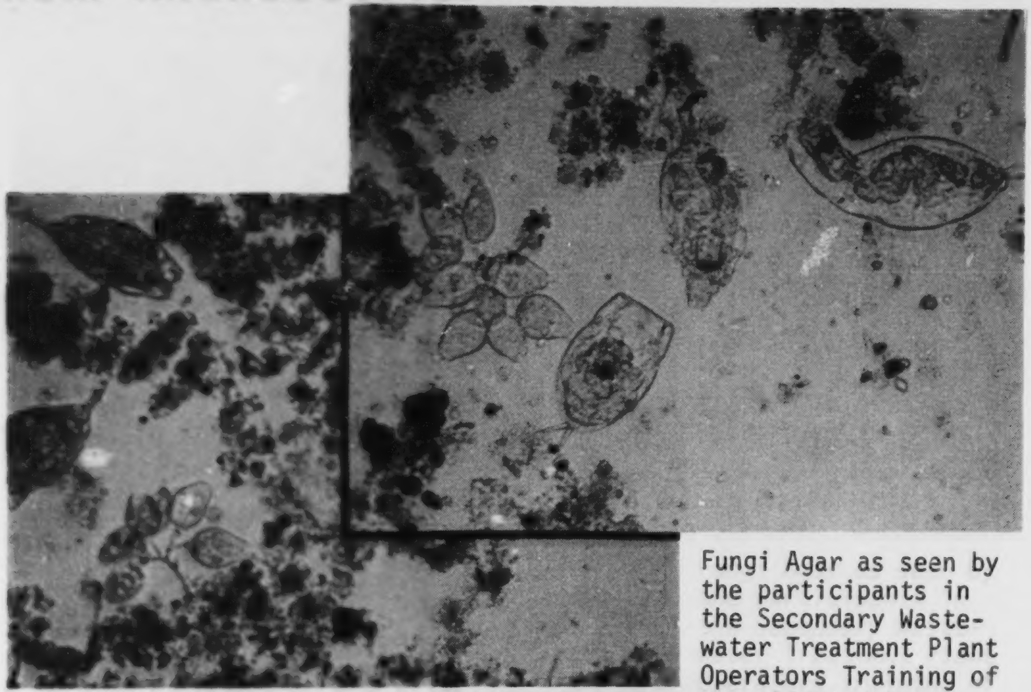
Chemicals m
through unle
hands before
put fingers to

d this facility become involved in fire, the Commanding
tion to let the facility burn if he determines that continued
ensive contaminated water run-off or, 2) could result in inc
esulting in a release of toxic compounds into the air. It would
written authority from the Facility Manager to do so if necessa
should be discussed with the insurers of the establishment.

5

Materials used by the Chevron Chemical Company in their Agricultural Chemical Emergencies, Spills and Fires program. Pre-emergency planning is the focus of this training.

FROM MICROSCOPIC:



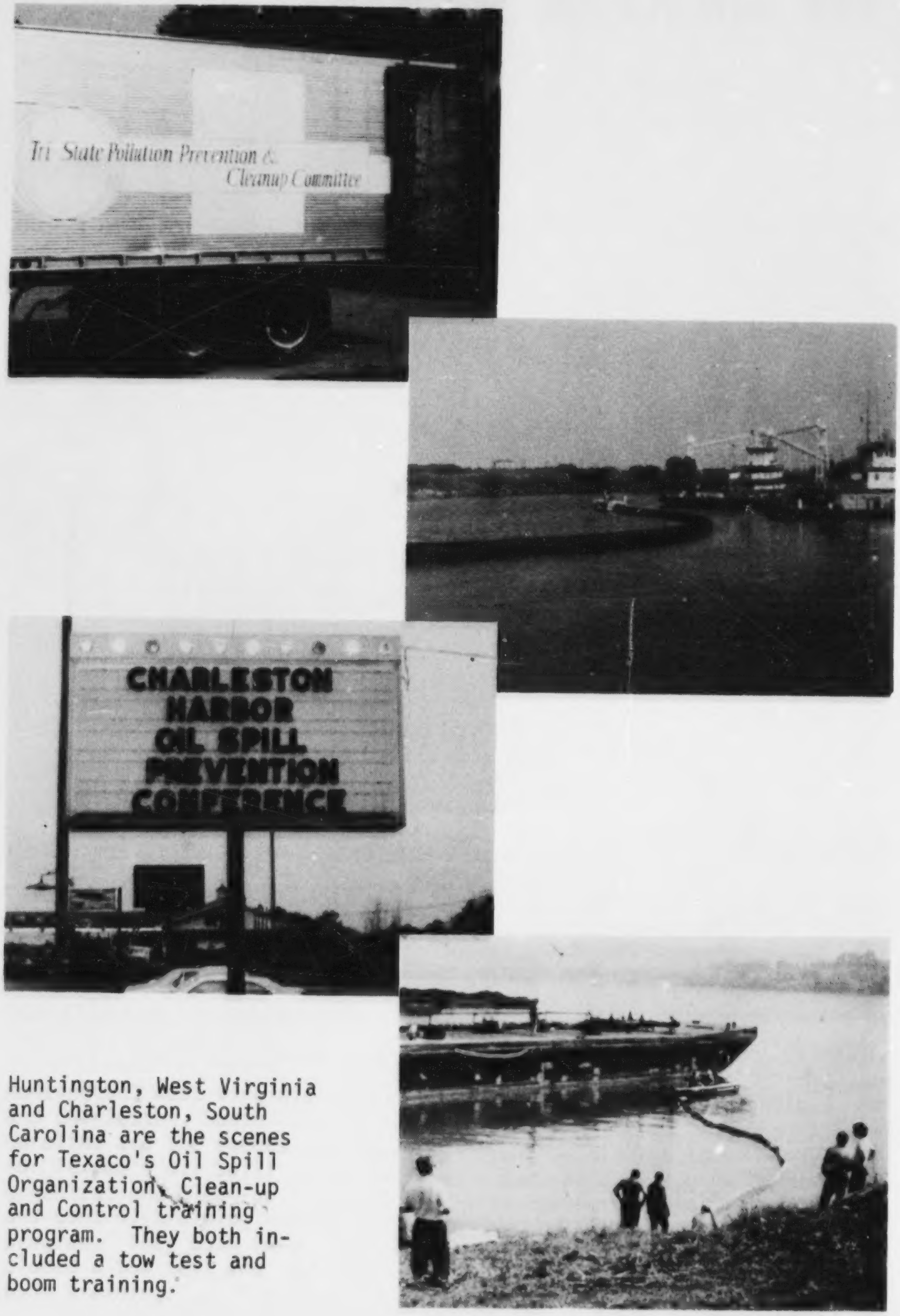
Fungi Agar as seen by the participants in the Secondary Wastewater Treatment Plant Operators Training of Consolidated Papers, Inc.

TO MONUMENTAL:

Collision risk too great
MINISTER ORDERS TANKERS TO LEAVE
Fire In The Harbor

Visuals used to dramatize the seriousness of pollution problems during one of Gulf's oil spill prevention training programs. The headlines and scenes are real.

REAL LIFE PROBLEMS:


Tri State Pollution Prevention & Cleanup Committee
CHARLESTON HARBOR OIL SPILL PREVENTION CONFERENCE

Huntington, West Virginia and Charleston, South Carolina are the scenes for Texaco's Oil Spill Organization, Clean-up and Control training program. They both included a tow test and boom training.

AND SIMULATED PROBLEMS:

A Bad Day at Bunker Point, an oil spill training seminar of Gulf, includes role-playing exercises in which managers are chosen from the audience to play the role of the terminal manager who must deal with a major oil spill, hostile community groups, environmentalists and governmental officials. Here the "terminal manager" is being interviewed on a T.V. talk show. The subject is the environmental responsibilities of corporations.

INTERNATIONAL:

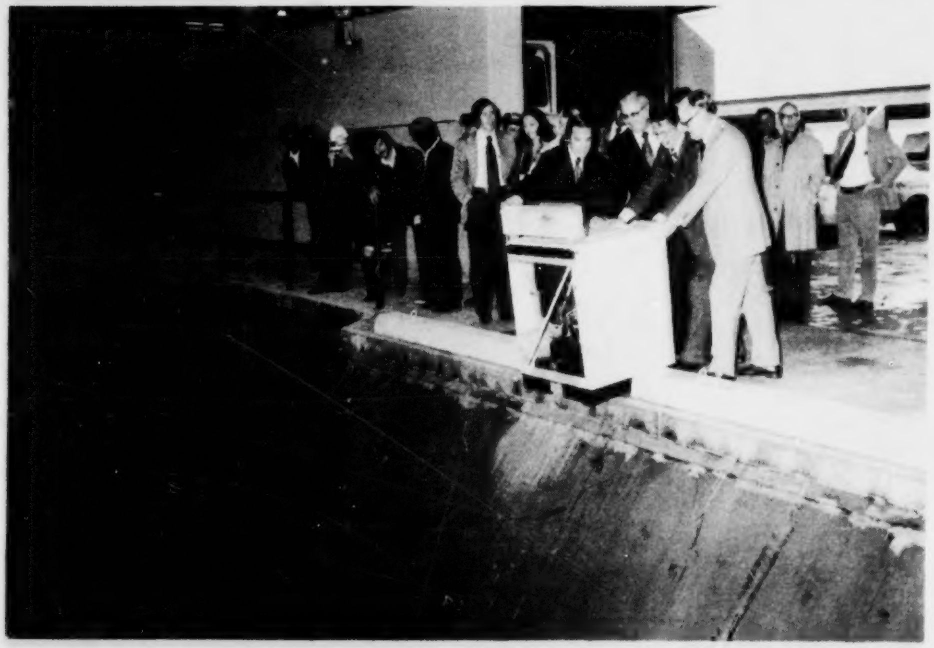
Key personnel responsible for environmental management nationally as well as internationally attend the Westinghouse School for Environmental Management held annually.

Field exercises are conducted near Colorado State University at Fort Collins.

AND LOCAL:

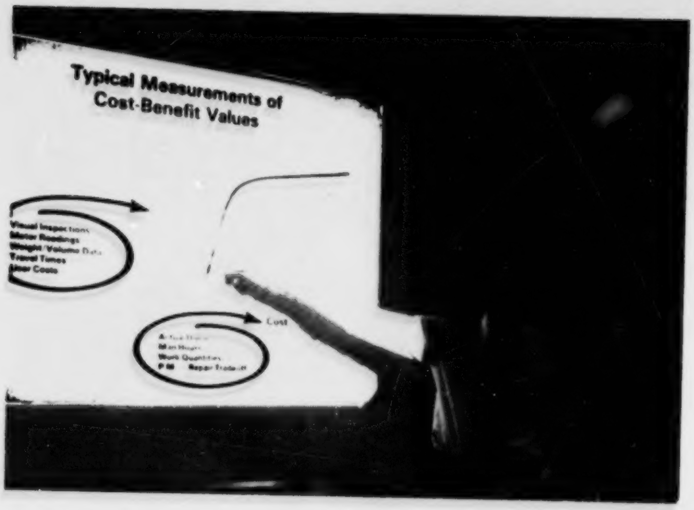
Solid Waste Management seminars given by the American Public Works Association include visits to the local facilities. This large conveyor separates like articles for baling.

FROM RECOVERY:



Resource recovery is the issue discussed at several of the seminars conducted by the American Public Works Association. All forms of garbage -- household refuse, auto parts, discarded appliances -- are brought to the bailing station in St. Paul, Minnesota.

TO HEALTH:


Typical Measurements of Cost-Benefit Values
Visual Inspections
Meter Readings
Weight/Volume Data
Travel Times
User Costs
Cost
Man Hours
Work Quantities
P M Repair Tradeoff

Cost-Benefit Values is a topic of vital importance to the participants in the Waterworks Management and Operation seminar of the American Public Works Association.

AND STRENGTH:

Participants in a Portland Cement Association seminar discussing the placement of a reinforcing bar in construction.

TUTORED:

Pre-test measurements on a reinforcing bar during the Level II Inspector (Nuclear) training program of the Portland Cement Association.

Preparing an aggregate sample for analysis during training at the Cement and Concrete Center of the Portland Cement Association.

TESTED:

Participant being evaluated on a Performance Test at the conclusion of the Level I Inspection Technician (Nuclear) training program conducted by the Portland Cement Association.

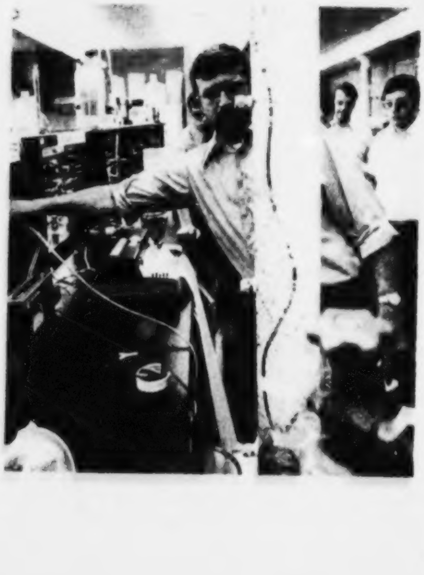
AND TRIED:

Concrete mix design preparation by participants in one of the 49 courses offered by the Portland Cement Association which include technical training courses, nuclear training, manufacturing processes, sales and marketing and management training.

Hands-on use of instrumentation in the Recognition of Occupational Health Hazards sponsored by the American Industrial Hygiene Association.

Photo reprinted from the Marquette University Bulletin 1977-78

PROJECT FINDINGS



Photos reprinted from the Michigan Technological University Catalog 1975-76

ALPHABETICAL LIST

OF

PROGRAM SUMMARIES

I. Alphabetical List of Program Summaries

Air Pollution Control Association
- Refresher, Continuing Education Courses

American Board of Nuclear Medicine (The Society of Nuclear Medicine)
- Physician Certification in Nuclear Medicine

American Chemical Society
- Various

American Industrial Hygiene Association
- Inhalation Toxicology Workshop
- Recognition of Occupational Health Hazards
- Toxicology Seminar

American Institute of Plant Engineers
- Energy Conservation and Management Seminars

American Public Works Association (APWA)
- Sewer Rehabilitation
- Solid Waste Management
- Street Cleaning and Maintenance III
- Troubleshooting O & M Problems in Municipal Wastewater Treatment Facilities
- Urban Drainage
- Waterworks Management and Operation

American Pulpwood Association
- Southern Logging and Water Quality; Logging and Soil/ Water Protection in the Applachian Forests

Anatrol
- A Variety of Noise and Vibration Seminars

O. L. Angevine Associates
- Various Noise Control Programs

Arkansas Power and Light Company
- Conservation Seminars
- Lineman Training

Asbestos Information Association/North America
- Asbestos - Federal and State Regulations
- Asbestos in the Atmosphere
- Asbestos in Water
- Recommended Practices for Handling Asbestos Fiber
- Recommended Work Practices for Use and Handling of Asbestos Products
- What You Should Know About Asbestos and Health

Atomic Industrial Forum, Inc.
- * Methods for Measuring Radiation In and Around Uranium Mills

Automotice Dismantlers and Recyclers of America (ADRA)
- * Various Materials

Chevron Oil Company
- * Shipboard Oil Spill Prevention

Chevron, Standard Oil of California
- * AUDIO 1 Computer Program
- * Noise Control Guideline No. 3B

Chevron Chemical Company, Standard Oil of California
- * Agricultural Chemical Emergencies, Spills and Fires

Chevron Research Company, Standard Oil of California
- * COMNOI Computer Program

Columbus and Southern Ohio Electric Company
- * Pesticides, Energy

Consolidated Papers, Inc.
- * Secondary Wastewater Treatment Plant Operators Training

Duquesne Light Company
- * The Beaver Valley Emergency Preparedness Plan

Environmental Management Association
- * Career Development and Registration Program

W. R. Grace and Company
- * Energy Conservation

Gulf Energy and Minerals Company
- * Anti Pollution Safety Device Training

Gulf Trading and Transportation Company
- * A Bad Day at Bunker Point

Institute of Noise Control Engineering
- * Inter-Noise 78

The Institute of Paper Chemistry
- * Microbiology
- * Water and Wastewater Control
- * Water Quality and Aquatic Ecology

Minnesota Mining and Manufacturing (3M)
- * Commute-A-Van
- * Energy Conservation Program
- * Pollution Prevention Pays

Mobil Oil Corporation
- * Modern Refining Technology
- * Oil Spill Prevention and Control Course

Harold R. Mull, Bell and Associates
- * Management of Noise Control in Industrial Plants
- * Noise Control in Manufacturing

National Council of the Paper Industry for Air and Stream Improvement (NCASI)
- * Analytical Procedures for Bacteriological Analysis of Water and Wastewater
- * Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD
- * Principles and Procedures for Water and Wastewater Color Measurement

National Water Well Association
- * Water Treatment and Purification

The Nuclear Medicine Technology Certification Board (NMTCB)
(The Society of Nuclear Medicine)
- * Nuclear Medicine Technologist Certification

Portland Cement Association
- * Cement Chemists Seminar
- * Fundamentals of Occupational Noise and Dust Monitoring
- * Kiln Optimization Short Course
- * Level I Inspection Technician (Nuclear)
  Level II Inspector (Nuclear)
- * Mill Grinding Short Course
- * Pollution Control Short Course

Pratt Whitney Aircraft Group (United Technologies Corporation)
- * Chemical Waste Treatment

Scott Paper Company
- * Project DIET (A Decrease in Energy Today)

The Society of Nuclear Medicine (see American Board of Nuclear Medicine and the Nuclear Medicine Technology Certification Board)

Texaco
- * Oil Spill Organization, Clean-Up and Control

Texaco and NUS Company
- * Oil Spill Response Training

Westinghouse Electric Corporation
- * The Westinghouse International School for Environmental Management

Yankee Atomic Electric Company (University of Lowell)
    * Basic Radiological Health
    * Health Physics Certification Review

LIST OF PROGRAMS

BY

ENVIRONMENTAL CATEGORY

AIR PROGRAMS

Air Pollution Control Association
- Refresher, Continuing Education Courses

American Industrial Hygiene Association
- Inhalation Toxicology Workshop

Portland Cement Association
- Fundamentals of Occupational Noise and Dust Monitoring

COMPOSITE PROGRAMS

American Chemical Society
- Various

American Industrial Hygiene Association
- Recognition of Occupational Health Hazards
- Toxicology Seminar

Arkansas Power and Light Company
- Conservation Seminars
- Lineman Training

Asbestos Information Association/North America
- Asbestos - Federal and State Regulations
- Asbestos in the Atmosphere
- Asbestos in Water
- Recommended Practices for Handling Asbestos Fiber
- Recommended Work Practices for Use and Handling of Asbestos Products
- What You Should Know About Asbestos and Health

Automotive Dismantlers and Recyclers of America (ADRA)
- Various Materials

Environmental Management Association
- Career Development and Registration Program

Minnesota Mining and Manufacturing (3M)
- Pollution Prevention Pays

Mobil Oil Corporation
- Modern Refining Technology

Portland Cement Association
- Pollution Control Short Course

Westinghouse Electric Corporation
- The Westinghouse International School for Environmental Management

ENERGY PROGRAMS

American Institute of Plant Engineering
- Energy Conservation and Management Seminar

Columbus and Southern Ohio Electric Company
- Pesticides; Energy

W. R. Grace and Company
- Energy Conservation

Minnesota Mining and Manufacturing (3M)
- Commute-A-Van
- Energy Conservation Program

Portland Cement Association
- Cement Chemists Seminar
- Kiln Optimization Short Course
- Mill Grinding Short Course

Scott Paper Company
- Project DIET (A Decrease in Energy Today)

NOISE PROGRAMS

Anatrol Corporation
- A Variety of Noise and Vibration Seminars

O. L. Angevine Associates
- Various Noise Control Programs

Chevron, Standard Oil of California
- AUDIO 1 Computer Program
- Noise Control Guideline No. 3B

Chevron Research Company, Standard Oil of California
- COMNOI Computer Program

Institute of Noise Control Engineering
- Inter-Noise 78

Harold R. Mull, Bell and Associates
- Management of Noise Control in Industrial Plants
- Noise Control in Manufacturing

Portland Cement Association
- Fundamentals of Occupational Noise and Dust Monitoring

PESTICIDES PROGRAMS

Chevron Chemical Company, Standard Oil of California
- Agricultural Chemical Emergencies, Spills, Fires

Columbus and Southern Ohio Electric Company
- Pesticides; Energy

POTABLE WATER PROGRAMS

American Public Works Association (APWA)
- Sewer Rehabilitation
- Urban Drainage
- Waterworks Management and Operation

American Pulpwood Association
- Southern Logging and Water Quality; Logging and Soil/ Water Protection in the Applachian Forests

Chevron Oil Company
- Shipboard Oil Spill Prevention

Gulf Energy and Minerals Company
- Anti Pollution Safety Device Training

Gulf Trading and Transportation Company
- A Bad Day at Bunker Point

The Institute of Paper Chemistry
- Microbiology
- Water and Wastewater Control
- Water Quality and Aquatic Ecology

Mobil Oil Corporation
- Oil Spill Prevention and Control Course

National Council of the Paper Industry for Air and Stream Improvement (NCASI)
- Analytical Procedures for Bacteriological Analysis of Water and Wastewater
- Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD
- Principles and Procedures for Water and Wastewater Color Measurement

National Water Well Association
- Water Treatment and Purification

Texaco
- Oil Spill Organization, Clean-Up and Control

Texaco and NUS Company
- Oil Spill Response Training

RADIATION PROGRAMS

American Board of Nuclear Medicine
- Physician Certification in Nuclear Medicine

Atomic Industrial Forum, Inc.
- Methods for Measuring Radiation In and Around Uranium Mills

Duquesne Light Company
- The Beaver Valley Emergency Preparedness Plan

The Nuclear Medicine Technology Certification Board (NMTCB)
- Nuclear Medicine Technologist Certification

Portland Cement Association
- Level I Inspection Technician (Nuclear)
- Level II Inspector (Nuclear)

Yankee Atomic Electric Company (University of Lowell)
- Basic Radiological Health
- Health Physics Certification Review

SOLID WASTE PROGRAMS

American Public Works Association (APWA)
- Solid Waste Management
- Street Cleaning and Maintenance III

WASTEWATER PROGRAMS

American Public Works Association (APWA)
- Troubleshooting O & M Problems in Municipal Wastewater Treatment Facilities

Consolidated Papers, Inc.
- Secondary Wastewater Treatment Plant Operators Training

The Institute of Paper Chemistry
- Water and Wastewater Control

National Council of the Paper Industry for Air and Stream Improvement (NCASI)
- Analytical Procedures for Bacteriological Analysis of Water and Wastewater
- Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD
- Principles and Procedures for Water and Wastewater Color Measurement

Pratt Whitney Aircraft Group
- Chemical Waste Treatment

UNIVERSITY/COMMUNITY COLLEGE RELATED PROGRAMS

Kansas State University
- Institute for Environmental Research

Miami-Dade Community College
- Marine Science Technology

University of Florida
- Environmental Biology

University of Miami
- Marine and Atmospheric Science

A SUMMARY PROFILE

OF

TRAINING PROGRAMS

THE 9 TABLES THAT FOLLOW REPRESENT AN ATTEMPT TO CONCISELY PORTRAY THE ENVIRONMENTAL AREAS ACCORDING TO:

- name of Business & Industry and Trade & Professional Associations
- number of participants (monthly, yearly, other)
- program length
- instructional design (instructional methods, instructional materials, types of media)
- completion award (CEUs, college credit, certification)

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
Air Pollution Control Association				
*Refresher Courses		35 (per course)		2 hours (per course)
*Continuing Education Courses			NA	2 days
American Industrial Hygiene Association				
*Inhalation Toxicology Workshop			NA**	3 days
Portland Cement Association				
*Fundamentals of Occupational Noise and Dust Monitoring		50		2 days

**NA = Not Available or Not Applicable

1

AIR TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Lecture	NA	NA	NA		
Lecture	Texts, Course notes	NA	NA		
Hands-on experience, speakers, case studies	NA	NA	NA		
Presentations, survey and sampling	NA	NA	NA		

TABLE

A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
American Chemical Society				
*Various			Ten yrs. 25,000	Usually 2-5 days
American Industrial Hygiene Association				
*Recognition of Occupational Health Hazards	40-50			5 days
*Toxicology Seminar		350		2 days
Arkansas Power and Light Company				
*Conservation Seminars		10,000		Usually 1 hour
*Lineman Training			All new lineman	3 to 4 hours
Asbestos Information Association / North America				
*Asbestos-Federal and State Regulations *Asbestos in the Atmosphere *Asbestos in Water *Recommended Practices for Handling Asbestos Fiber *Recommended Work Practices for Handling of Asbestos Products *What You Should Know About Asbestos and Health		NA	NA	NA

**NA = Not Available or Not Applicable

2

COMPOSITE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Speakers, presentations	Manuals, visuals	Audio tape	NA**		
Survey techniques	Pretest, modules	NA	4.0		
Speakers, presentations	NA	NA	NA		
Presentation, discussion	NA	NA	NA		
O.J.T.	NA	NA	NA		
NA	Publications, pamphlets, brochures, posters, newsletters	Films	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Number of Participants Yearly	Other	Program Length
Automotive Dismantlers and Recyclers of America (ARDA) *Various Materials			NA	NA
Environmental Management Association *Career Development and and Registration Program			NA	Variable
Minnesota Mining and Manufacturing (3M) *Pollution Prevention Pays			Open to all employees 1975-77 30 awards	All year
Mobil Oil Corporation *Modern Refining Technology			All employees	1 day
Portland Cement Association *Pollution Control Short Course			NA	5 days

**NA = Not Available or Not Applicable

2

COMPOSITE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
NA	Publications, audio visual materials	Video tapes	NA		
Varies by institution	Varies by institution	NA**			X
Applications program	Brochures, articles, posters, speeches	Slides			3 P Award
Workshop	NA	NA	NA		
Presentations, discussion	NA	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
Westinghouse Electric Corporation *The Westinghouse International School for Environmental Management		35		2 weeks

2
COMPOSITE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Classroom presentations, field exercises, case studies, laboratory work	Texts, study guides, notes	Slides, overhead transparencies			X

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Yearly	Other	Program Length
Portland Cement Association				
*Cement Chemists Seminar			Biannual 100	3 days
*Kiln Optimization Short Course			NA	5 days
*Mill Grinding Short Course			NA	4 days
Scott Paper Company				
*Project DIET (A Decrease in Energy Today)			All 20,000 employees	All year long

**NA = Not Applicable or Not Available

3
ENERGY TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Presentations	NA**	NA	X		
Presentations, discussions	Pre course study materials	NA	3.4		
Presentations, discussions	NA	NA	2.2		
On-going program	Buttons, brochures	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Number of Participants Yearly	Other	Program Length
American Institute of Plant Engineering *Energy Conservation and Management Seminar			NA**	3 days
Columbus and Southern Ohio Electric Compahy *Pesticides; Energy			1976-77 11,732	Throughout the school year
W. R. Grace and Company *Energy Conservation			Every Manager	All year long
Minnesota Mining and Manufacturing (3M) *Commute-A-Van			1976 566	All year long
*Energy Conservation Program			Open to all Employees	All year long

**NA = Not Applicable or Not Available

3

ENERGY TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Speakers, small groups, workshop	Manual	NA			X
O.J.T., presentations, demonstrations, audio visual	Pamphlets	Slides	NA		
On-going program	Manual	NA	NA		
On-going program	Pamphlets, fact sheets, brochures, posters	NA	NA		
On-going program	Manual	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
Anatrol Corporation *A Variety of Noise and Vibration Seminars		100-200		Usually 5 days
O. L. Angevine Associates *Various Noise Control Programs			NA	Usually 20 hours
Chevron, Standard Oil of California *AUDIO 1 Computer Program			All plant employees	Variable
*Noise Control Guideline No. 3B			NA	Usually 4, 3-hour sessions
Chevron Research Company, Standard Oil of California *COMNOI Computer Program			NA	Variable

**NA = Not Available or Not Applicable

4

NOISE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Presentations, demonstrations, problem-solving	Actual equipment, sound and vibration instruments	NA**	NA		
Presentations, hands-on experience, problem-solving	Computer facilities, sound and vibration instruments, texts, technical journals	Tape recordings			X
Applications program	Computer analysis	NA	NA		
Applications program	Noise surveys and instrumentation	NA	NA		
Prediction program	Computer analysis	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
Institute of Noise Control Engineering *Inter-Noise 78		300		3 days
Harold R. Mull, Bell and Associates *Management of Noise Control in Industrial Plants			NA	2 days
*Noise Control in Manufacturing			NA	3 days
Portland Cement Association		50		2 days

**NA = Not Available or Not Applicable

4
NOISE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Conference, guest lecturers	NA**	NA	NA		
Group discussions, role-playing, problem-solving	Workbooks, manuals	Slide/tape presentations, films	NA		
Workshop, problem-solving, lab work, group discussion	Text, lab testing equipment	NA	NA		
Presentations, survey and sampling	NA	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Number of Participants Yearly	Other	Program Length
Chevron Chemical Company, Standard Oil of California *Agricultural Chemical Emergencies, Spills and Fires			300,000	2½ hours
Columbus and Southern Ohio Electric Company *Pesticides; Energy			1976-77 11,732	Throughout the year

**NA = Not Available or Not Applicable

5

PESTICIDES TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Presentation, audio visual	Script	Slides	NA**		
O.J.T.; presentations, demonstrations, audio visual	Pamphlets	Slides	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Yearly	Other	Program Length
American Public Works Association *Sewer Rehabilitation			NA**	2 days
*Urban Drainage		240		2 days
*Waterworks Management and Operation		90-100		2 days
American Pulpwood Association *Southern Logging and Water Quality; Logging and Soil/Water Protection in the Appalachian Forests			NA	Variable
Chevron Oil Company *Shipboard Oil Spill Prevention			NA	Variable
Gulf Energy and Minerals Company *Anti Pollution Safety Device Training		200		7 days
Gulf Trading and Transportation Company *A Bad Day at Bunker Point			1975-77 700	1 day

**NA = Not Available or Not Applicable

6
POTABLE WATER TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Presentations, discussions, panels	NA	NA	1.0		X
Presentations, audio visual	Instructional aids	NA	1.2		
Presentations, discussions	NA	NA	1.1		X
Audio visual	Scripts	Slides	NA		
Audio visual	Workbook, script	Slides, tapes	NA		
Lectures, audio visual, hands-on training	Manual, scale models, pre and post tests	Slides tapes			X
Seminar, role-playing	NA	Films	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
The Institute of Paper Chemistry *Microbiology			NA**	3 days
*Water and Wastewater Control			NA	5 days
*Water Quality and Aquatic Ecology			NA	3 days
Mobil Oil Corporation *Oil Spill Prevention and Control Course			All employees	5 days
National Council of the Paper Industry for Air and Stream Improvement (NCASI) *Analytical Procedures for Bacteriological Analysis of Water and Wastewater			NA	Variable
*Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD			NA	Variable
*Principles and Procedures for Water and Wastewater Color Measurement			NA	Variable

**NA = Not Applicable or Not Available

6

POTABLE WATER TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Lectures, demonstrations lab practice	NA	NA	NA		
Lectures, presentations, discussion, problem-solving	NA	NA			X
Lectures, presentations, field trips	NA	NA	NA		
Presentations, audio visual, hands-on experience	NA	Video tapes, films	NA		
Audio visuals	Manuals	8 color filmstrips and tapes	NA		
Audio visuals	Visuals, charts, manuals, worksheets	7 color filmstrips and tapes	NA		
Audio visuals	Manuals	5 color filmstrips and tapes	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Number of Participants Yearly	Other	Program Length
National Water Well Association *Water Treatment and Purification			NA**	Variable
Texaco *Oil Spill Organization, Clean-Up and Control			NA	4 to 5 days
Texaco and NUS Corporation *Oil Spill Response Training			NA	Variable

**NA = Not Available or Not Applicable

6
POTABLE WATER TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Correspondence course	Written materials	NA			X
Written	Manual	NA	NA		
Audio visual	Script	Video/ tapes	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Yearly	Other	Program Length
American Board of Nuclear Medicine *Physician Certification in Nuclear Medicine			1972-76 2,783	Variable depending on specialty
Atomic Industrial Forum, Inc. *Method for Measuring Radiation in and around Uranium Mills			NA	3 days
Duquesne Light Company *The Beaver Valley Emergency Preparedness Plan			Entire valley	Year round
The Nuclear Medicine Technology Certification Board (NMTCB) *Nuclear Medicine Technologist Certification			NA	Variable
Portland Cement Association *Level I Inspection Technician (Nuclear)			NA	5 days
*Level II Inspector (Nuclear)			NA	5 days

**NA = Not Available or Not Applicable

7

RADIATION TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
NA**	Written materials	NA			X
Workshop	NA	NA	NA		
Emergencies drills	Written materials	NA	NA		
NA	Written materials	NA			X
Speakers, demonstrations, application sessions	Written materials	NA	3.1	X	
			2.8	X	

TABLE

A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
Yankee Atomic Electric Company (University of Lowell)				
*Basic Radiological Health		5		2 weeks
*Health Physics Certification Review			NA	1 week

**NA = Not Available or Not Applicable

7
RADIATION TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Speakers	NA**	NA	NA		
Speakers	Written materials	NA	NA		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
American Public Works Association (APWA)				
*Solid Waste Management		250		2 days
*Street Cleaning and Maintenance II			Scheduled 5 times in 1978	2 days

8
SOLID WASTE TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Workshop, role playing	Text	NA**	1.1		
Workshop	NA	NA	1.0		

TABLE
A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants			Program Length
	Monthly	Yearly	Other	
American Public Work Association (APWA) *Troubleshooting O & M Problems in Municipal Wastewater Treatment Facilities		150		5 days
Consolidated Papers, Inc. *Secondary Wastewater Treatment Plant Operators Training			NA	5 days
The Institute of Paper Chemistry *Water and Wastewater Control			NA	5 days

**NA = Not Available or Not Applicable

9
WASTEWATER TRAINING PROGRAMS

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Presentations, group discussions	Visuals	NA**	3.8		
Classroom lecture, discussion, lab study, problem-solving	Microscope slides, instruments	NA	NA		
Lectures, presentations, discussion, problem-solving	NA	NA			X

TABLE

A SUMMARY PROFILE OF

Business & Industry and Trade & Professional Associations	Number of Participants Monthly	Number of Participants Yearly	Other	Program Length
National Council of the Paper Industry for Air and Stream Improvement (NCASI)				
*Analytical Procedures for Bacteriological Analysis of Water and Wastewater			NA	Variable
*Analytical Procedures for Measurement of Suspended Solids. Settleable Solids, Turbidity and BOD			NA	Variable
*Principles and Procedures for Water and Wastewater Color Measurement			NA	Variable
Pratt Whitney Aircraft Group (United Technologies Corporation)				
*Chemical Waste Treatment			NA[**]	60 hours

[**] NA = Not Available or Not Applicable

INSTRUCTIONAL DESIGN			COMPLETION AWARD		
Instructional Methods	Instructional Materials	Types of Media	CEUs	College Credit	Certification
Audio visual	Manuals	8 Color Filmstrips and tapes	NA		
Audio visual	Visuals, charts, manuals, worksheets	7 Color Filmstrips and tapes	NA		
Audio visual	Manuals	5 Color Filmstrips and tapes	NA		
NA	NA	NA	NA		

TRAINING PROGRAM

SUMMARIES

TABLE OF CONTENTS

Page

Air Pollution Control Association. 85

American Board of Nuclear Medicine 87

American Chemical Society. 89

American Industrial Hygiene Association
- Inhalation Toxicology Workshop. 91
- Recognition of Occupational Health Hazards. 93
- Toxicology Seminar. 95

American Institute of Plant Engineers. 97

American Public Works Association
- Sewer Rehabilitation. 99
- Solid Waste Management. 101
- Street Cleaning and Maintenance III 103
- Troubleshooting O & M Problems in Municipal Wastewater Treatment Facilities. 105
- Urban Drainage. 107
- Waterworks Management and Operation 109

American Pulpwood Association. 111

Anatrol Corporation. 113

O. L. Angevine Associates. 115

Arkansas Power and Light Company
- Conservation Seminars 117
- Lineman Training. 119

Aebostos Information Association/North America 121

Atomic Industrial Forum, Inc.. 123

Automotive Dismantlers and Recyclers of America. 125

Chevron Chemical Company Standard Oil Company of California. . . 127

Chevron Oil Company. 129

Chevron Research Company Standard Oil of California. 131

Chevron Standard Oil of California
- Audio 1 Computer Program. 133
- Noise Control Guideline No. 3B-Hearing Conservation Surveys 135

Columbus and Southern Ohio Electric Compnay. 137

Page

Consolidated Papers, Inc. 139

Duquesne Light Company 141

Environmental Management Association 143

W. R. Grace and Company 145

Gulf Energy and Minerals Company 147

Gulf Trading and Transportation Company 149

Institute of Noise Control Engineering 151

The Institute of Paper Chemistry

- Microbiology 153
- Water Quality and Aquatic Ecology 155
- Water and Wastewater Control 157

Minnesota Mining and Manufacturing

- Commute - A - Van 159
- Energy Conservation Program 163
- Pollution Prevention Pays (3P) 165

Mobil Oil Corporation

- Modern Refining Technology 169
- Oil Spill Prevention and Control Course 171

Harold R. Mull, Bill and Associates

- Management of Noise Control in Industrial Plants 173
- Noise Control in Manufacturing 175

National Council of the Paper Industry for Air and Stream Improvement

- Analytical Procedures for Bacteriological Analysis of Water and Wastewater 177
- Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD 179
- Principles and Procedures for Water and Wastewater Color Measurements 181

National Water Well Association 183

The Nuclear Medicine Technology Certification Board 185

Portland Cement Association

- Cement Chemists Seminar 187
- Fundamentals of Occupational Noise and Dust Monitoring 189
- Kiln Optimization Short Course 191
- Level I Inspection Technician (Nuclear); Level II Inspector (Nuclear) 193

Page

Portand Cement Association (cont'd)
- Mill Grinding Short Course. 195
- Pollution Control Short Courses 197

Pratt and Whitney Aircraft Group 199

Scott Paper Company. 201

Texaco 203

Texaco and NUS Corporation 205

Westinghouse Electric Corporation. 207

Yankee Atomic Electric Company
- Basic Radiological Health 211
- Health Physics Certification Review 213

AIR POLLUTION CONTROL ASSOCIATION

PROGRAM TITLE: Refresher, Continuing Education Courses

CONTACT: Harold M. Englund, Editor
Air Pollution Control Association
14400 Fifth Avenue
Pittsburgh, Pennsylvania 15213

I. General Summary

The Air Pollution Control Association sponsors both continuing education and refresher courses to professionals in the field during their annual meetings. The short courses are developed to meet the varying needs of the Association's membership. New technical personnel are constantly entering the air pollution field who need to be trained, and existing personnel frequently need to update or broaden their knowledge beyond the bounds of their immediate technical discipline.

During the Association's 70th Annual Meeting held in Toronto on June 16-19, 1977 a series of ten Refresher Courses and eight Continuing Education Courses were offered to its membership. The Association's Committee on Education and Training sponsored the Refresher Courses which were offered on Sunday, June 19, 1977. Attendance was limited to the first 35 persons registering for each course. Individuals attended two courses by selecting one each from Group 'A' and 'B' respectively, since each group consisted of five two-hour lectures.

APCA's eight Continuing Education short courses were offered on four days, June 16-19, 1977. The first four were offered on June 16-17, and the second four were offered on June 18-19. APCA mailed texts or course notes to all registrants prior to the Annual Meeting date to provide attendees with an opportunity to become familiar with the course material before arrival for the course.

The courses include:

Refresher Courses

(Group 'A')

A-1 "Technical Presentations: To Enlighten or Obscure"
A-2 "Citizen Involvement in Air Pollution Control Programs"
A-3 "Arc Corona - The Bane of Electrostatic Precipitations"
A-4 "Characterization of Power Plant Emissions"
A-5 "Atmospheric Inversion and Stack Design"

(Group 'B')

- B-1 "Technical Meeting Graffiti - How to Improve Visual Presentations"
- B-2 "Community Noise"
- B-3 "Passive Remote Sensing of Plume and Area Pollutants"
- B-4 "Ambient Fine Particles"
- B-5 "Meteorological Programs for Siting of Power Plants and Industrial Facilities"

Continuing Education Courses

- 77-1 Fundamentals of Particulate Collection
- 77-2 Stack Sampling and Monitoring
- 77-3 Industrial Control Equipment for Gaseous Pollutants
- 77-4 Environmental Impact Statements
- 77-5 Fine Particulate Behavior
- 77-6 Meteorology and Air Pollution Control
- 77-7 Continuous Monitoring Techniques Applied to Stationary Source Emissions
- 77-8 Electrostatic Precipitation

PROGRAM TITLE: Physician Certification in Nuclear Medicine

CONTACT: Mrs. Margaret Glos
Administrator
The Society of Nuclear Medicine
475 Park Avenue South - 15th Floor
New York, New York 10016

I. General Summary

The American Board of Nuclear Medicine was established on July 28, 1971, to set educational standards and to evaluate the competence of individuals in nuclear medicine. The Board has responsibility for establishing requirements for certification, for conducting examinations for certification in nuclear medicine and for issuing certificates to those who fulfill its requirements. Nuclear Medicine is defined as that specialty in the practice of medicine dealing with the diagnostic, therapeutic (exclusive of the use of sealed radiation sources), and investigative uses of radionuclides. The primary purpose of the Board is to establish and maintain standards of training, education and qualification of physicians rendering care in nuclear medicine. One of the major areas of training related to nuclear medicine is that of radiation protection for staff and patients.

To achieve its primary goal, the Board:

1) establishes graduate training requirements;
2) influences the standards of training institutions;
3) aids in the assessment and accreditation of training facilities;
4) assesses the credentials of candidates applying for the examinations of the Board;
5) grants certificates in nuclear medicine to qualified applicants; and
6) maintains a registry of practitioners certified by the Board.

Physicians certified by the American Board of Nuclear Medicine have fulfilled prerequisites for training and have successfully completed the qualifying written examination encompassing the medical uses of radioactive materials and related physical sciences. The certifying examination evaluates the candidates' competence in the management of patients in the area of clinical nuclear medicine, including: radiobioassay, in vitro and in vivo measurements, nuclear imaging, and therapy with unsealed radionuclides. The evaluation also includes medical nuclear physics, radiation biology, radiation protection, instrumentation, radiopharmaceutical chemistry and statistics.

During the first five examinations, from 1972 through 1976, the Board has certified 2,783 individuals. The American Board of Nuclear Medicine is a Conjoint Board of the American Board of Internal Medicine, the American Board of Pathology, the American Board of Radiology, and is sponsored by the Society of Nuclear Medicine.

PROGRAM TITLE: Various

CONTACT: Dr. Moses Passer
Department of Educational Activities
American Chemical Society
1155 16th Street, N.W.
Washington, DC 20036

I. General Summary

The American Chemical Society is dedicated to the continuing education of chemists and chemical engineers. In 1965, the American Chemical Society Short Courses were introduced; currently there are 46 courses offered. These American Chemical Society Short Courses are concentrated (two to five full days) presentations by small (one to three members) teaching staffs of subject matter expressly selected to meet the continuing education needs of chemists and chemical engineers. About 60 sessions are presented annually nationwide. The total participation in the first 10 years of the program has been approximately 25,000.

Several of the American Chemical Society Short Courses specifically related to pollution control and abatement include:

- Cleaner Fuels from Coal
- Dynamics and Control of Air Pollution
- Water Pollution and Its Control
- Molecular Photochemistry of Organic Molecules
- Laboratory Safety - Recognition of and Management of Hazards
- Chemical Carcinogenesis

American Chemical Society Audio Courses are study units consisting of a tape and a reference manual which contains all of the visuals (tables, equations, graphs, references, problems) which a speaker might normally use in a classroom presentation. Several of these Audio Courses are environmentally related:

- Biological Degradation of Municipal and Industrial Waste
- Chemical Basis of Environmental Issues

* Pesticide Chemistry
* Cleaner Fuels from Coal

In addition to widespread use within the industry, the American Chemical Society Audio Courses are being used by colleges and universities for classroom enrichment and for library reference.

PROGRAM TITLE: Inhalation Toxicology Workshop - In cooperation with the Lovelace Inhalation Toxicology Research Institute

CONTACT: Mr. Larry D. Hyde
Training Coordinator
American Industrial Hygiene Association
66 S. Miller Road
Akron, Ohio 44313

I. General Summary

This three-day workshop features "hands-on" experience with the latest equipment in the field. It is designed to provide personnel already engaged in occupational health and toxicology activities with an opportunity to broaden their knowledge. Leading experts in the field, nationwide, present the latest data and research providing participants an understanding of the fundamentals of inhalation toxicology. Emphasis is placed on laboratory methods for evaluating the toxicity of airborne materials as a basis for establishing risk estimates that are used in formulating government regulations and developing strategies for monitoring and controlling work place air contamination.

The following information discusses an Inhalation Toxicology Workshop offered by the American Industrial Hygiene Association. (See following page).

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

Inhalation Toxicology Workshop

JANUARY 23, 1978

MORNING		AFTERNOON
INTRODUCTION TO INHALATION TOXICITY	Roger McClellan Lovelace Inhalation Tox. Res. Institute	HANDS-ON LABORATORY EXPERIENCE IN GENERATING AND MONITORING AIRBORNE GASES, MISTS AND PARTICLES
SYSTEMS FOR PRODUCING EXPERIMENTAL ATMOSPHERES OF GASES	Morton Lippmann New York University Medical Center	
SYSTEMS FOR EXPOSING ANIMALS TO INHALATION ATMOSPHERES	Bruce B. Boecker Lovelace Inhalation Tox. Res. Institute	

JANUARY 24, 1978

ANIMAL SPECIES USED IN INHALATION STUDIES	J. Russell Lindsey University of Alabama Medical Center	HANDS-ON LABORATORY EXPERIENCE IN SAMPLING, CHARACTERIZING AND UNDERSTANDING AIRBORNE GASES, MISTS, AND PARTICLES
ANATOMY OF THE RESPIRATORY TRACT	Walter S. Tyler University of Calif., Davis	
DEPOSITION AND RETENTION	Bruce O. Stuart Battelle Pacific Northwest Labs.	

Banquet - Albuquerque Hilton Inn - 7:30 P.M. Cash bar.
Speaker - To be announced

JANUARY 25, 1978

		CASE STUDIES:	
PULMONARY FUNCTION STUDIES	Joe Mauderly Lovelace Inhalation Tox. Res. Institute	BENZENE EXPOSURE	Howard E. Runion Gulf Science & Technology Co.
PATHOLOGY RESPONSE OF THE LUNGS	Andrew S. Tegeris Pharmacopathics Research Labs., Inc.	EXPOSURE TO AIRBORNE EFFLUENTS OF FOSSIL FUELS	Harold N. MacFarland Gulf Science & Technology Co.
DOSE RESPONSE RELATIONSHIPS	Carrol S. Weil Carnegie-Mellon University	EXPOSURE TO THERMAL DECOMPOSITION PRODUCTS	Irving Einhorn University of Utah

PROGRAM TITLE: Recognition of Occupational Health Hazards (Co-sponsored by National Institute for Occupational Safety and Health

CONTACT: Mr. Larry D. Hyde
Training Coordinator
American Industrial Hygiene Association
66 S. Miller Road
Akron, Ohio 44313

I. General Summary

This five-day workshop is presented monthly to an average group of 40 to 50. It is an introductory course designed for the individual in the field of industrial hygiene who is responsible for identifying problems and evaluating the industrial environment. The trainee will be able to:

1) Recognize and identify at least one existing potential hazard of the following types (biological, chemical, environmental or physical), given descriptions or characteristics in context;

2) Apply proper concepts and terminology to the evaluation results from at least one "walk-through" survey for each of the following industrial processes (chemical, metal, welding, mechanical/physical), given descriptions or simulated observations of real-life situations.

The course participation results in the award of 4 CEUs. The technical content includes industrial hygiene fundamentals and survey techniques and procedures. The four major survey techniques are covered. The preliminary or "walk-through" survey is emphasized. Basic fundamentals in hazard recognition include the type of hazard, its cause, effect and control. Practice is provided in surveying industrial processes exhibiting chemical agents, physical agents and welding agents.

II. Program Highlights

The course content is very comprehensive and flexible enough to fit the needs of any workshop. There are 40 modules beginning with

An Introduction to Industrial Hygiene after the Orientation and Pre-test. A sampling of a few of the 40 modules follows:

- Biomodes of Entry
- Toxicity of Chemical Agents
- Industrial Hygiene Surveys
- Toxicity Evaluations
- Chemical Hazards Workshop
- Ionizing Radiation
- Noise and Noise Workshop
- Vibration

The American Industrial Hygiene Association has used these modules as the basis for a custom-designed workshop on occupational health hazards for more than ten companies so far. The course content can be adapted to the specific needs of a company by deleting some modules and building on others.

PROGRAM TITLE: Toxicology Seminar

CONTACT: Mr. Larry D. Hyde
Training Coordinator
American Industrial Hygiene Association
66 S. Miller Road
Akron, Ohio 44313

I. General Summary

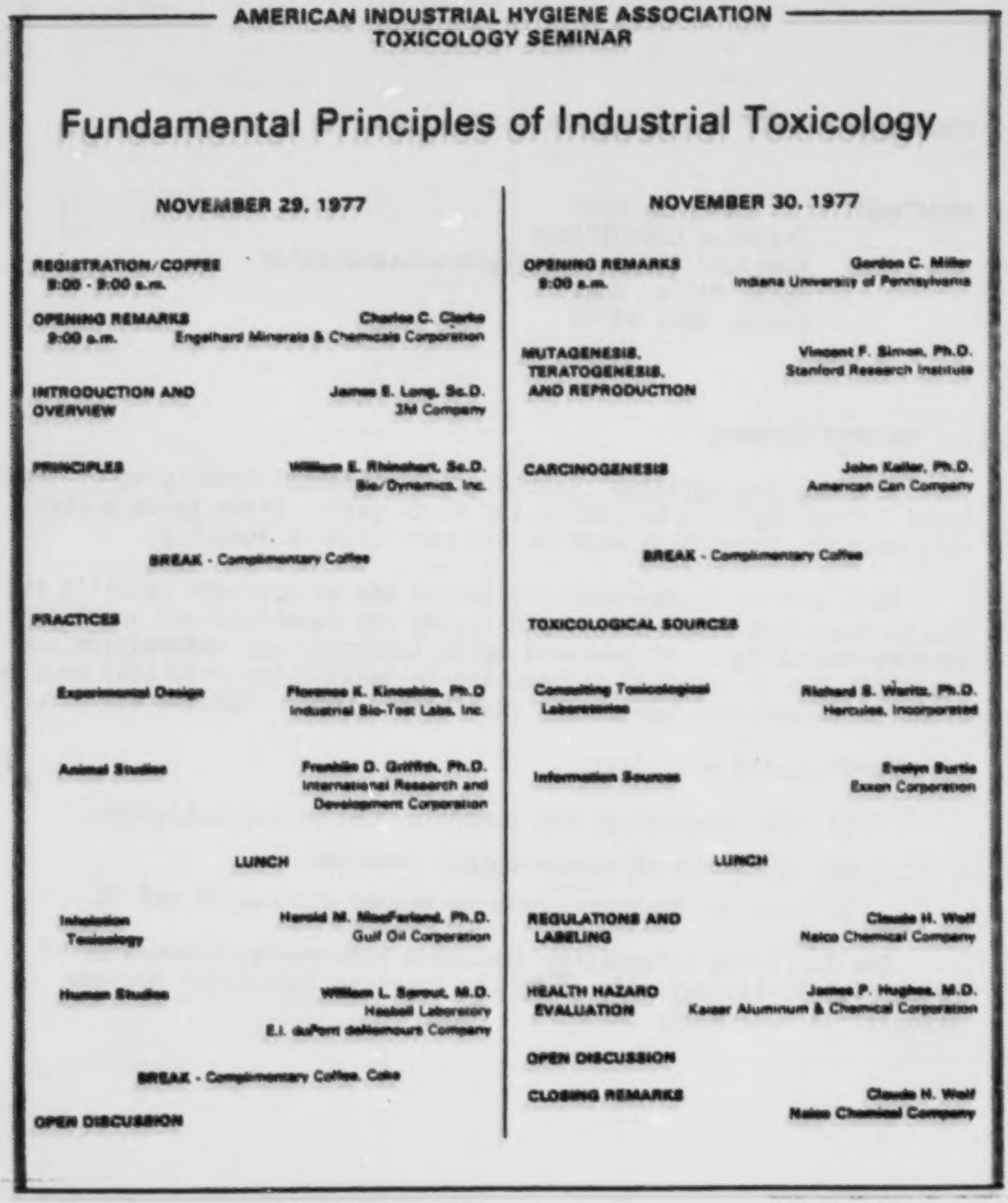
This two-day workshop, subtitled "Fundamental Principles of Industrial Toxicology", is beginning its fifth year. Given twice a year, this program attracts as many as 350 participants annually.

This seminar is designed for people who do not have specific training in toxicology but who are addressing the questions and problems concerning toxicology. It presents basic toxicological information and describes how to use that information in meeting the practical problems of worker exposures, government regulations and product safety.

Participants will learn:

1) the terminology and concepts used by toxicologists;
2) the scope of toxicological problems;
3) when professional help is needed and how to get it.

The following information discusses Fundamental Principles of Industrial Toxicology offered by the American Industrial Hygiene Association Toxicology Seminar.



AMERICAN INDUSTRIAL HYGIENE ASSOCIATION
TOXICOLOGY SEMINAR

Fundamental Principles of Industrial Toxicology

NOVEMBER 29, 1977

REGISTRATION/COFFEE **8:00 - 9:00 a.m.**	
OPENING REMARKS **9:00 a.m.**	Charles C. Clarke Engelhard Minerals & Chemicals Corporation
INTRODUCTION AND OVERVIEW	James E. Long, Sc.D. 3M Company
PRINCIPLES	William E. Rinehart, Sc.D. Bio/Dynamics, Inc.
BREAK - Complimentary Coffee	
PRACTICES	
Experimental Design	Florence K. Kinoshita, Ph.D Industrial Bio-Test Labs, Inc.
Animal Studies	Franklin D. Griffith, Ph.D. International Research and Development Corporation
LUNCH	
Inhalation Toxicology	Harold M. MacFarland, Ph.D. Gulf Oil Corporation
Human Studies	William L. Sprout, M.D. Haskell Laboratory E.I. duPont deNemours Company
BREAK - Complimentary Coffee, Coke	
OPEN DISCUSSION	

NOVEMBER 30, 1977

OPENING REMARKS **9:00 a.m.**	Gordon C. Miller Indiana University of Pennsylvania
MUTAGENESIS, TERATOGENESIS, AND REPRODUCTION	Vincent F. Simon, Ph.D. Stanford Research Institute
CARCINOGENESIS	John Keller, Ph.D. American Can Company
BREAK - Complimentary Coffee	
TOXICOLOGICAL SOURCES	
Consulting Toxicological Laboratories	Richard S. Waritz, Ph.D. Hercules, Incorporated
Information Sources	Evelyn Burtis Exxon Corporation
LUNCH	
REGULATIONS AND LABELING	Claude H. Wolf Nalco Chemical Company
HEALTH HAZARD EVALUATION	James P. Hughes, M.D. Kaiser Aluminum & Chemical Corporation
OPEN DISCUSSION	
CLOSING REMARKS	Claude H. Wolf Nalco Chemical Company

PROGRAM TITLE: Energy Conservation and Management Seminars

CONTACT: Mr. William Hogeland, P.E.
Course Director
American Institute of Plant Engineers
1021 Delta Avenue
Cincinnati, Ohio 45208

I. General Summary

This is a three-day workshop sponsored by the American Institute of Plant Engineers. The content of this course includes the following:

* The Energy Conservation Program: How to Set Up an In-Plant Program for an Overall Energy Audit.

* An In-Plant Energy Workshop: Practical Application of Concepts Developed to Actual In-Plant Systems.

* Concepts of Heat Integration, Heat Exchange Including Waste Heat Recovery, Uses of Industrial Waste as Fuel, Heat Exchangers, Integration of Steam, Cooling Water Uses and Feed/Product Exchangers.

The workshop is aimed at plant engineering management and others vitally interested in improving profitability of operations.

II. Program Highlights

Instruction is offered by recognized experts in each course segment. Presentations feature these unique content areas:

Process Modifications, exploring relationships between process, energy, and environment, including sample problems, and energy conservation techniques.

Boilers and Powerhouses, including boiler efficiency, flame monitoring, and burner controls.

Direct-Fired Equipment, including an introduction to furnaces and heaters, expected efficiencies, excess air requirements, heat recovery applications, monitoring and control.

Refrigeration, including operating cycles, expected efficiencies, and conservation techniques.

HVAC Systems, including topical losses, methods of reducing loss, process heating integration, monitoring and control.

PROGRAM TITLE: Sewer Rehabilitation

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This two-day workshop is sponsored in cooperation with the APWA Institute for Water Resources.

Funds provided through a U.S. EPA Research Grant have provided in part for some information used in the curriculum design of this workshop.

The objective of the workshop is to provide middle managers and supervisory personnel with an overview of procedures for conducting infiltration/inflow studies, rehabilitation and repair of sewer systems, detection of infiltration and inflow and sewer maintenance.

The workshop is aimed at superintendents and managers of collection facilities and other personnel concerned with operation and maintenance of collection systems.

The course results in the award of 1.0 CEUs.

II. Program Highlights

- The workshop's technical content concerning AM-9 and 3M Elastomeric Grout is unique.
- Data presented in U.S. EPA contract procurement requirements are emphasized rigorously.
- A sample workshop outline with more information follows:

Program Outline -- Workshop No. 6

SEWAGE COLLECTION & TREATMENT SYSTEMS V

Sewer Rehabilitation

First Day

TOPICS:

USEPA Contract Procurement Requirements - A review by USEPA of regulations affecting the use of unit price or time and materials, flexibility with regard to changed conditions as determined in the field and other key factors such as use of force account and reimbursable vs. non-reimbursable work.

Contract Provisions - A discussion by an engineer and a sewer service contractor of provisions required to allow responsive proposals to be prepared for sewer rehabilitation.

Cost Estimating Factors - A discussion of project difficulty factors and their effects on individual and total cost components.

Technical Considerations for Grouting - Presentations concerning AM-9 and 3M Elastomeric Grout to provide guidance as to what are groutable conditions, use of admixtures, control of gel times, and other factors which must be considered when specifying and using these grouts.

Standards and Inspection Problems- A panel discussion to comment on the need for standards of performance for rehabilitation work and how and when inspection of rehabilitation work should be accomplished.

General Discussion

Second Day

TOPICS:

Rehabilitation of Manholes - The various methods and materials which have been used and the selection criteria for determining the proper application for an individual or combination of rehabilitation technique(s).

Pipe Lining - An introduction to a new method developed in England of "in place" lining.

Sliplining-Choice of Materials- An overview of the types of materials available, their individual characteristics and technical factors which affect the choice for a particular project.

Sliplining-Installation Considerations - Observations concerning physical factors at the site and in the sewer pipe to be rehabilitated which affect the use of the sliplining techniques.

Rehabilitation of Large Diameter Pipe-the Centerline Process and Gunnite Repair - Technical considerations for the structural repair of major sewer lines.

Rehabilitation of Building Sewers - The available methods of correct problems in building sewers will be discussed.

Discussion, Critique and Presentation of Certificates.

1.0 C.E.U.s

AMERICAN PUBLIC WORKS ASSOCIATION
(APWA)

PROGRAM TITLE: Solid Waste Management

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This two-day workshop is sponsored in cooperation with the APWA Institute for Solid Wastes. Curriculum guideline development for this workshop is supported in part with funds provided by a U.S. EPA Training Grant.

The objective of the first day of the workshop is to provide information to solid waste managers concerning the techniques and costs of solid waste collection, processing, recovery and disposal. The focus is on costs - effectiveness, appropriateness of particular approaches, and some troublesome aspects of personnel management.

The second day focuses on decision-making at the local level, and the impact of federal and state programs. The emphasis is on facility siting in the morning and federal and state program priorities in the afternoon.

The workshop is aimed at the operating solid waste professional/manager, both public and private sectors. Other professionals associated with solid waste management such as regulatory personnel, consultants and equipment manufacturers have also participated.

The course results in the award of 1.1 CEUs.

II. Program Highlights

* The APWA Workshop Series is a unique concept in public works management and administration training.

* Nine functional workshops on major public works operations plus one reserved for special topics provide comprehensive coverage and insights into the administrative problems faced by public works personnel today.

* Approximately 250 people participate annually.

* A sample workshop outline follows:

Course Outline -- Workshop No. 4

SOLID WASTE MANAGEMENT VII

First Day

TOPICS:

Is There "Gold" in Garbage? - The basic principles of resource recovery technology will be covered.

Resource Recovery - Possibilities and Opportunities. Low technology as well as high technology options will be discussed.

Resource Recovery - State of the Art. All major in-place demonstration projects will be discussed.

After the Landfill Design Engineer Leaves - Operating experiences of local solid waste managers will be highlighted to aid in identification and resolution of similar problems elsewhere.

How to Handle Grievances - This role-playing exercise will highlight basic principles of labor--management relations.

Collection Techniques - Mechanical collection experiments will be discussed with emphasis on cost and implementation issues.

Productivity in Collection - Incentive techniques, cost centers, trade offs, etc. will be highlighted.

Second Day

TOPICS:

Where is Your Next Landfill? - This discussion will outline socio-political elements in the process of site selection at the local level.

Objections to Landfill Sites - Responses to the previous presentation by representatives of groups involved in site selection.

Council Work Session - Landfill Site Selection. A role-playing exercise to illustrate the interplay among all parties in the selection process.

Solid Waste - Priorities for Your Region -- The solid waste representative of USEPA in each workshop region will present program priorities based on The Resource Conservation and Recovery Act of 1976.

Solid Waste Priorities for Your State - State solid waste officials will present the program priorities and emphasis.

Roundtable Discussion - State and EPA representatives will answer questions and discuss comments on programs and priorities.

Awarding of Certificates

1.1 CEUs

PROGRAM TITLE: Street Cleaning and Maintenance III

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This is a two-day workshop sponsored in cooperation with the APWA Institute for Solid Wastes and the Institute for Transportation. The conference was held bi-nationally. Two-day workshops were held in Santa Maria, California; Toronto, and Winnipeg.

Curriculum guideline development for this workshop comes in part from information provided by an NSF and Public Agency research grant.

The first day objectives of the workshop cover theoretical matters involving recent research on economical routing of vehicles. Toxic materials found on street surfaces and their inherent danger to public health are discussed.

The second day format is the result of practical study and research techniques designed to provide middle management personnel with modern methods which proposes that most operations affecting street cleaning and highway maintenance can be planned.

The workshop is aimed at the higher levels of management whose daily work load has not permitted examination of some of the more recent techniques developed by research.

The course results in the award of 1.0 CEUs.

II. Program Highlights

- Methods of dealing with toxic waste encountered on the public highways.
- Management and Theory Practice.
- Innovations in pavement design and maintenance.

* A sample workshop outline follows:

Outline - Workshop No. 5
STREET CLEANING & MAINTENANCE III

First Day

Traffic Controls for Construction & Maintenance Worksites - A review of a forthcoming APWA publication on the subject of worksite protection is undertaken including application of practices in Maine and Louisiana Explanation of Decision Tree Concept.

Street Maintenance techniques - Flexible pavements: An updating of practices and materials employed in flexible pavement maintenance and construction.

Energy Conservation by use of bonded, thin lift Portland Cement overlays as exemplified in Iowa in 1976-7.

A brief description on "hand" routing method from the forthcoming APWA Manual of Street Cleaning Practice.

Street Maintenance - Techniques Rigid Pavements: an updating of practices and materials employed in rigid pavement maintenance and construction.

Toxic Materials in Street Surface Contaminants - Particulates contributed directly and indirectly to roadways by traffic and land use activities represent a serious source of water pollutants. The need of effective sweeping is emphasized to reduce the hazard.

Recycling of Portland Cement Reinforced Concrete Pavement, as practiced in Iowa, 1976-7.

Second Day

Management Theory and Practice - The art and science of decision making - from the new APWA publication: Management Essentials for Public Works Administrators.

Productivity and Communication - How managers and supervisors can increase their own productivity and improve communication in their own organization.

Maintenance Standards - The principles and procedures of developing effective standards for crew performance.

Maintenance Management of Objectives - Introduction to managing maintenance - from objectives to actions.

Developing Work Programs - Determining maintenance needs and preparing long range plans.

Crew Scheduling - Principles of scheduling and crew scheduling procedures.

Using Crew Schedules - Practical aspects of "working a schedule" and making schedule adjustments.

Controlling and Evaluating Work - Principles and concepts of controlling costs through effective work control.

Presentation of Certificates

AMERICAN PUBLIC WORKS ASSOCIATION

PROGRAM TITLE: Troubleshooting O & M Problems in Municipal Wastewater Treatment Facilities

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This five-day 'short course' has five objectives for those treatment plant operators who attend:

- to train municipal, state and federal wastewater treatment personnel in the process of troubleshooting and problem-solving for operation and maintenance problems within their plants;
- to upgrade the level of technical information and assistance;
- to create an awareness of the need for cooperative relationships and attitudes between treatment facility personnel and local, state and federal regulatory agencies;
- to expose operating personnel to realistic treatment plant operating problems, their causes, effects and methods of correction; and,
- to provide an overview and technical review of wastewater treatment plant operations.

The program is designed for municipal wastewater treatment supervisory and management personnel, consulting engineers, and other identifying and solving operation and maintenance problems.

II. Program Highlights

- Instruction is offered by recognized experts in each course segment.
- Presentations feature unique materials, visuals, techniques and format.

* Annual participation is approximately 150 people.

* Emphasizes troubleshooting skills and procedures, such as:

  Pre- and primary treatment
  Trickling Filters
  Oxidation Lagoons
  Activated Sludge
  Solids Handling
  Lab Practice
  Flow Measurement

* Content is both specialized and detailed but reflects the local concerns.

PROGRAM TITLE: Urban Drainage

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This program is a two-day seminar sponsored in cooperation with the APWA Institute for Water Resources. It is scheduled to be presented at least four times during 1978 at different locations throughout the country.

The objective of the course is to present and discuss new techniques in solving the problems of urban drainage including stormwater retention, control and treatment plus a review of design principles. The workshop is intended for officials of public agencies who are involved in the planning, or design of urban drainage facilities or in code enforcement, as well as consultants.

Continuing Education Units (CEUs) are awarded for participation in this program. The actual award is 1.2 CEUs. Approximately 240 people participated in the workshop during 1977. Instructors make use of various instructional aids, including audio visual materials, in order to present this very technically oriented seminar.

II. Program Highlights

Several of the seminar topics indicate the nature of this program:

* Stormwater Runoff Models - A description and discussion of the merits of mathematical models.
* Pollution Characteristics of Stormwater - Potential for Treatment.
* Source Control Techniques for Pollution Abatement.
* Drainage Law - Principles and Practice.

AMERICAN PUBLIC WORKS ASSOCIATION
(APWA)

PROGRAM TITLE: Waterworks Management and Operation

CONTACT: Mr. Malcolm C. Van Duersen
General Manager
Education Foundation
American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

I. General Summary

This program is a two-day seminar which is designed especially for Public Works personnel. The objective of this workshop is to help waterworks and wastewater managers in utilities and public agencies. Relevant information is presented on technical, management and legislative requirements to enable managers to improve their performance. The Waterworks Management and Operation Workshop is designed primarily for mid-level and upper-level managers and engineers of water and wastewater systems in utilities and public agencies. Consulting engineers and management consultants also participate.

The workshop participant is awarded 1.1 CEUs.

II. Program Highlights

* The program attracts approximately 90-100 people annually.

* It is designed and staffed to be as responsive as possible to local programs while maintaining consistency and the necessary standards.

* A sample workshop agenda is shown on the following page:

Outline -- Workshop No. 8
Waterworks Management and Operation II
(Designed Especially for Public Works Personnel)

First Day

The U.S. Safe Drinking Water Act - A review of the meaning and implications of this act for water utilities and water agencies (Denver) - The U.S. Act contrasted with the proposed revision to Canadian Drinking Water Objectives (Winnipeg).

Water Quality - A summary of federal water standards and a review of the American Water Works Association goals for water quality and service (Denver).

Water Main Renewals - The City of Winnipeg Water Main Renewal Program -- Details concerning the program will be considered (Winnipeg).

Disinfection - A review of problems associated with today's chlorination practices and new approaches to disinfection.

Joint Operations of Water and Wastewater Agencies - A review of joint water and wastewater operations within an overall water resources management framework. (Denver) Problems involving joint operation of water and wastewater with particular reference to the consolidation of twelve previously separate municipalities into one joint operation.

Operators Certification and Training - State programs for operator certification and opportunities for personnel training for water utilities and water agencies.

Fire Service Requirements - Fire code grading systems for distribution and storage from the viewpoint of the agencies making system ratings.

Second Day

Management Theory and Practice - The art and science of decision making with emphasis on the techniques used by different types of managers.

Productivity and Communication - How managers can increase their own productivity and improve communication of their organizations - from the new APWA publication Management Essentials for Public Works Administrators.

Work Measurement and The Use of Computers - A discussion of experiences in the use of work measurement and the use of computers in water agencies and water utilities.

Corrosion Problems in Water Works Practice.

Water Rates - A summary of modern water rate making practices for establishing water service charges.

Modern Construction Methods - A review of up-to-date construction tecniques for water utility improvements.

Discussion and Awarding of Certificates.

AMERICAN PULPWOOD ASSOCIATION

PROGRAM TITLE: Southern Logging and Water Quality; Logging and Soil/Water Protection in the Appalachian Forests

CONTACT: Mr. A. W. Wimble
Administrative Assistant
American Pulpwood Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

I. General Summary

The American Pulpwood Association develops programs that their members use to conduct their own training programs. Both of the programs named above deal with water quality and logging. There are 35 mm slide programs with accompanying written scripts of the narration.

The response to these programs has been very positive. Private industry, state extension services, state forestry associations, state/federal forest services and universities (primarily those offering an advanced degree in Forestry) have purchased one or both of these programs.

PROGRAM TITLE: A Variety of Noise and Vibration Seminars

CONTACT: Mr. Tony L. Shipley, Vice President
Sales and Marketing
Anatrol Corporation
11305 Reed Hartman Highway
Suite 227
Cincinnati, Ohio 45241

I. General Summary

Anatrol Corporation is a noise consulting firm which also designs and presents training seminars on vibration and noise analysis techniques. Anatrol personnel conduct five-day seminars in cooperation with the University of Wisconsin, as well as for equipment manufacturers. An estimated 100-200 vibration and noise engineers attend such seminars annually, including the seminar at the University of Wisconsin.

An example of the types of information discussed in an Advanced Noise and Vibration Measurement and Analysis Techniques with the University of Wisconsin are:

* Time Series Analysis
* Applications of Time Series Analysis
* Fundamentals of Frequency Response Analysis
* Structural Frequency Response Testing

This course covers the application of time series analysis to noise and vibration problems, with particular emphasis on digital signal processing techniques. The fundamentals of time series analysis, including Fourier analysis, data sampling, basic functions and error analysis are covered in detail. A second major application area is structural frequency response analysis. Fundamentals of single and multidegree-of-freedom linear systems are discussed.

II. Program Highlights

Anatrol feels that their programs are unique because they go beyond the initial definition of the problem. Using their own equipment, they can define the problem and begin to develop the solution.

Anatrol works with equipment manufacturers who must modify equipment to meet noise and vibration standards. They also participate in initial design of equipment to meet standards.

O. L. ANGEVINE ASSOCIATES
Consultants in Acoustics

PROGRAM TITLE: Various Noise Control Programs

CONTACT: Mr. O. L. Angevine, P.E.
O. L. Angevine Associates
7661 Seneca Street
P.O. Box 98
East Aurora, New York 14052

I. General Summary

O. L. Angevine and Associates is a firm of professional engineers specializing in acoustics, noise and vibration. The firm is equipped with sound and vibration instruments of the latest type, which allow on-site measurements or laboratory analysis of tape recordings made in the field. The use of computer facilities for analysis can also be arranged. The firm has an extensive library of textbooks, technical journals, and commercial product literature in the area of acoustics, noise and vibration.

O. L. Angevine and Associates tailor their training programs in noise control to the needs of the group requesting the training. Seminars are typically 20 hours but can be longer, if necessary. Certificates are given to people who successfully complete the work.

II. Program Highlights

Some examples of the types of information covered would include:

* Industrial Noise Control
  - Noise surveys and analysis
  - Specifications for sound and vibration isolation of machinery
  - Recommendations for machine quieting
  - Design of machine parts for minimum noise generation
  - Reduction of factory process noise
  - Compliance with OSHA employee noise exposure standard
* Product Noise Control
  - Recommendations for designing quiet machines
  - Specification of materials for noise quieting
  - Specification of instruments and procedures for measuring noise
  - Recommendations for quality control assessment of product noise

* Community and Environmental Noise Control

  . Environmental noise surveys
  . Recommendations for reducing community noise and vibration
  . Comparison of measured noise with criteria of HUD and other governmental agencies

PROGRAM TITLE: Conservation Seminars (In cooperation with the State Department of Education)

CONTACT: Mr. Bill Coleman
P.O. Box 551
Little Rock, Arkansas 72203

I. General Summary

The Conservation Seminars have been developed to insure that some exposure to environmental subjects is given to high school juniors and seniors. Also, as a way to supplement some college-level curricula, the seminars are popular with a number of higher education institutions. During the past two years, the Environmental Affairs Section of Arkansas Power and Light Company has been able to speak to an average of 70 different groups, for a total audience of approximately 10,000 students per year. The school year 1977-78 will be no exception, the hope is to break this record of attendance.

There are four individuals from the section who participate in these seminars. Each person has developed his or her own presentation relating to environmental concerns from the perspective of their own industry and profession (environmental analysts). Conservation and environmental awareness criteria are the dominant themes. The presentation consists of a 15 minute verbal or visual presentation followed by an extensive question and answer session.

PROGRAM TITLE: Linemen Training

CONTACT: Mr. Bill Coleman
P.O. Box 551
Little Rock, Arkansas 72203

I. General Summary

This training program is one of two basic programs involving the Environmental Affairs Section of Arkansas Power and Light Company. It is directed to new linemen and involves an afternoon of discussion centered around environmental issues and the need for quality control during on-the-job activities. In this three to four-hour time period, an attempt is made to introduce new line-employees to the basic concepts surrounding issues of:

- air quality,
- water quality,
- land use,
- aesthetics,
- energy issues.

For this group, the subject of land use and aesthetics are most pertinent. The attempt in this seminar is to make employees aware of their actions while on the job and to be equally aware that they do have the opportunity to affect environmental quality. By being aware of some of the basic issues and the predominant areas of public concern, problems can be avoided. Arkansas Power and Light Company has been successful with this training approach - no public complaints for the past three years!

ASBESTOS INFORMATION ASSOCIATION/NORTH AMERICA (AIA/NA)

PROGRAM TITLE: Asbestos in the Atmosphere
Recommended Practices for Handling Asbestos Fiber
Asbestos in Water
What You Should Know About Asbestos and Health
Asbestos - Federal and State Regulations
Recommended Work Practices for Use and Handling of Asbestos Products

CONTACT: Mr. B. J. Pigg
Administrative Assistant
AIA/NA
1745 Jefferson Davis Highway
Crystal Square 4, Suite 509
Arlington, Virginia 22202

I. General Summary

The Asbestos Information Association/North America (AIA/NA) is an incorporated, non-profit organization consisting of over fifty firms engaged in the manufacture, sale or use of products containing asbestos fiber, or in the mining, milling or sale of asbestos fiber in North America. One of the principal objectives of the Association is to provide industry-wide information on the asbestos-health relationship and on industry efforts to eliminate problems associated with asbestos dust.

The Association prepares educational/information publications, like the ones mentioned in the program title, as well as a series of posters on "Asbestos Health Hints for the Workplace". In addition, as part of its educational program, the Association publishes a monthly newsletter to ensure that its members, affiliated organizations and others are kept abreast of current information and activities affecting the industry. A number of films concerning the asbestos-health relationship and industry efforts to control exposure to asbestos dust are also included in the Association's information program.

II. Program Highlights

The AIA/NA has functioned, since its establishment in December 1970, as the collective organization of the asbestos industry to obtain and disseminate authoritative information concerning the industry with emphasis on safety, health and environmental issues. Today, AIA/NA uniquely represents the overall asbestos industry with governmental groups and the news media as the industry spokesman.

While the pamphlets, posters, films and newsletters do not constitute a formal training program, they do serve a very necessary training/awareness purpose not only among employees within the asbestos industry but the public as well.

The Association's activities include:

- government relations
- medical affairs
- environmental control
- public relations
- legal affairs
- employee relations
- customer relations
- industry studies
- inter-industry relations
- industry-government conference
- international relations

ATOMIC INDUSTRIAL FORUM, INC.

PROGRAM TITLE: Methods for Measuring Radiation In and Around Uranium Mills

CONTACT: Mr. E. David Harward
Environmental Projects Manager
Atomic Industrial Forum, Inc.
7101 Wisconsin Avenue
Washington, DC 20014

I. General Summary

Although the Atomic Industrial Forum is generally not engaged in conducting training per se, they have sponsored a workshop on measuring radiation in and around uranium mills. The workshop, held in May, 1977, was co-sponsored by the U.S. EPA, U.S. ERDA, American Nuclear Society, Health Physics Society and the Atomic Industrial Forum, Inc.

This three-day seminar was basically an exchange of information and ideas which included technical presentations as well as demonstrations of measurement equipment.

Some of the topics included were:

* Review of environmental aspects of uranium mill operations by state, federal and industry representatives.
* Elements of an environmental surveillance program.
* Measurement of radon.
* Demonstration of equipment for measuring radon.
* Radon daughter measurements.
* In-plant measurements.
* Future problems and resolutions.

AUTOMOTIVE DISMANTLERS AND
RECYCLERS OF AMERICA (ADRA)

PROGRAM TITLE: Various Materials

CONTACT: Mr. Russell F. McKinnon
Executive Vice President
1000 Vermont Avenue, N.W.
Washington, DC 20005

I. General Summary

Although this national trade association conducts no formal training programs related to pollution control and abatement, they are included because of their strong commitment to energy and resource conservation.

Their industry is primarily concerned with the recovery and sale of parts from automobiles and trucks that have been wrecked or otherwise rendered inoperable as transportation vehicles. The impact of the used auto parts industry on the nation's energy and resource problems can be seen in several examples:

* The estimated savings realized by recycling auto and truck parts amounts to 80 million barrels of oil annually, or 12 import days of fuel.

* The used auto parts industry provides a vital source of scrap iron and steel to the scrap processors who cooperate as well in this effort to reduce unnecessary consumption of the nation's resources.

* Energy savings are also realized by recycling directly and by reusing automotive parts in their present form, instead of using precious energy to remelt and recast auto parts.

* The National Association of Recycling Industries estimates that over 30 times more energy is necessary to make a ton of aluminum from virgin sources than from scrap. The production of steel from virgin ores requires two to three times more energy than steel from recycled materials.

II. Program Highlights

ADPA is an active voice, albeit to its own benefit, in the conservation of our nation's natural resources and energy. They prepare and/or make available numerous publications,

"The Greatest National Resource - Recycling"
"Introducing the Used Auto and Truck Parts Industry"
"The Parts Recyclers Manual"
"ADRA Special Reports and Industry Aids"

audio visual materials,

"Automotive Recycling - A National Resource"
"Safety and Your Business"
"It's Up To You"

and videotapes,

"Image in the Marketplace"
"Dealing With the Auto Theft Problem"
"Working With the Media"
"Auto Parts Recovery"
"The Cancer of Auto Theft"
"Insurance Company Salvage Operations"
"The Automotive Industry"
"Hiring and Retaining Good Employees"
"Value, The Nation's Business and Logarithmic Spirals"
"Making a Profit in the Face of Inflation"

These are only a few of the many titles available from the Association on either a loan or purchase basis. The Dismantlers Digest is the magazine of ADRA.

The point made by the Association is a valid one, whether or not it is viewed as self-serving--energy and resource conservation awareness and practice are vital to this nation's future.

CHEVRON CHEMICAL COMPANY
STANDARD OIL COMPANY OF CALIFORNIA

PROGRAM TITLE: Agricultural Chemical Emergencies, Spills and Fires

CONTACT: Mr. T. T. Hubbard
Supervisor, Loss Prevention
Employee Relations - Safety
Chevron Chemical Company
Standard Oil Company of California
575 Market Street
San Francisco, California 94105

I. General Summary

AGRICULTURAL CHEMICAL EMERGENCIES: Spills and Fires, is a two and one half hour slide presentation, consisting of 260 slides with script, designed to help emergency service personnel prepare contingency plans so they can handle agricultural chemical emergencies as safely as possible. Pre-emergency planning receives the greatest emphasis as the best way to prevent losses and minimize human exposure. Time consuming preparations should be made now, not under the stress of emergency conditions.

II. Program Highlights

The presentation is divided into four major sections:

1) Introduction - emphasis is on methods of preventing human contact, symptoms of poisoning, first aid procedures and reading of container labels.

2) CHEMTREC - describes a national 24 hour emergency information telephone service provided by the Manufacturing Chemists Association capable of providing quick response advice on chemical emergencies. CHEMTREC (Chemical Transportation Emergency Center) will then contact the manufacturer or the Pesticide Safety Team Network operated by NACA (National Agricultural Chemicals Association) for cleanup assistance.

3) Spills - deals specifically with common types of agricultural chemical spills, rescue, containment methods, decontamination, and planning for such emergencies.

4) Fires - this section is divided into five sub-parts:

   a) Typical Facilities and Storage Practices
   b) Burning Characteristics
   c) Fire Fighting Tactics
   d) Post-Fire Cleanup
   e) Pre-Fire Planning

PROGRAM TITLE: Shipboard Oil Spill Prevention

CONTACT: Mr. W. R. Leek, Specialist
Environmental Programs
Chevron U.S.A.
Environmental Affairs
P.O. Box 3069
San Francisco, California 94119

I. General Summary

The Shipboard Oil Spill Prevention Training Program is designed for shipboard crews as a means of preventing human error during oil transfer operations which could lead to spills. The program illustrates common causes of shipboard spills resulting from faulty valve operation, hose connections, ballasting, bunkering, and communication problems and provides specific examples of spills and prevention techniques. The English speaking program consists of printed scripts, 35 mm slides and an audio-cassette presentation of the script keyed to the slides.

CHEVRON RESEARCH COMPANY
STANDARD OIL OF CALIFORNIA

PROGRAM TITLE: COMNOI Computer Program

CONTACT: Mr. J. D. Knapp, Manager
Invention Development
Chevron Research Company
Standard Oil of California
525 Market Street
San Francisco, California 94120

I. General Summary

COMNOI, a computer program for noise prediction models, is used in predicting community noise levels and can be used to evaluate alleviation measures directed toward noise control. COMNOI has been used with design engineers at all levels of projects, prior to the presentation of impact statements and as a guide to controlling noise. The user of the program has the flexibility to test various hypothetical approaches to a sound problem in order to determine predicted results of the approaches. Validated results of predictions of the COMNOI program, compared with actual on-site noise analyses, have demonstrated an extremely high direct correlation between the predictions of the COMNOI program and actual noise levels.

II. Program Highlights

The COMNOI program has been used to prepare environmental impact statements, to select sites and locate equipment, to determine acceptable noise levels for new equipment, to evaluate proposed noise barriers, to assess the feasibility of meeting noise ordinances and to optimize noise control measures. COMNOI has unique features that make it generally adaptable to outdoor noise environments. Because it is a three dimensional model, the program can compute the exact position and effect of various types of obstructions with respect to sound paths. These obstructions include topographical features, sound barriers of various shapes, dense arrays of equipment and groves of trees. Sources may be represented as single points, as uniform line or plane emitters, or as complex composites of point, line and plane sources. The program also computes atmospheric absorption from temperature and relative humidity (most other simulation models treat this as only a set of constants).

When COMNOI includes all existing noise sources, the computed noise levels should agree with those measured under the same conditions. If some sources, internal or external to an existing facility, are omitted, measured levels should exceed computed levels. For new facilities, the composite level from a COMNOI is a prediction. In this case, no direct comparisons are possible, but the site-specific attenuations can be determined by using noise from a source of known sound level in place of the proposed sources. In summary, COMNOI is a three-dimensional computer model which has provisions for representing complex sources and various types of attenuation in the transmission path. It predicts the individual dBA and octave band contributions of each of the more important sources ranked by their dBA level at each designated observer location and the aggregate sound pressure level produced from all of the sources entered.

The COMNOI programs are available for licensing directly to users and are available through a service bureau having a national network system.

CHEVRON
STANDARD OIL OF CALIFORNIA

PROGRAM TITLE: AUDIO 1 Computer Program

CONTACT: Mr. Stanley H. Judd
Staff Environmental Health and Pollution Engineer
Environmental Health and Toxicology
Chevron
Standard Oil of California
225 Bush Street
San Francisco, California 94104

I. General Summary

The AUDIO 1 computer program is an application of computer analysis to industrial audiometric test results. Hearing tests are conducted by technicians, nurses, or physicians at various company locations. Data from the tests are entered to become a record in the AUDIO 1 personnel data input file. The computer program stores and sorts records of employees tested. These records are supplied in various printout formats for review by nontechnical personnel, as well as by medical personnel, to assist in the evaluation of potential hearing loss or change in condition of hearing levels. While AUDIO 1 screens individual records to locate potential problems, determines whether the hearing condition is new, about the same, or worse than the preceding test, the program is not intended to replace diagnosis and evaluation by a physician or audiologist. Rather, it is a tool to assist in locating hearing problems and provides an automated record storage and recovery system which can be easily evaluated by technical and nontechnical personnel.

AUDIO 1 consists of four basic elements: individual industrial audiograms, data on individual employees, the computational programs, and a timeshare computer system. Individual industrial audiograms include test date and Hearing Threshold Level (dB) in both ears. Individual employee data, accessed by the social security number, includes birthdate, sex, company, department, division and location. The computational programs, written in Fortran IV, use data from the individual industrial audiograms and employee data to generate various types of reports. The fourth element, the timeshare computer system with an interactive CLP (Command Language Program), permits users at various locations to establish and maintain their own audiometric and personnel data files, and to select the desired reports.

Five types of reports can be generated from the AUDIO 1 program. These are: Individual Reports, Summary Reports, All Persons Reports, Atypical Reports, and Impairment Reports. Reports are used to analyze the existence of noise induced hearing problems or other types of hearing impairment, within company locations, divisions, and departments. The reports list test results including AMA standards for impairment ratings, high frequency loss, significant threshold shifts according to proposed OSHA requirements, and atypical conditions such as low frequency loss, conductive loss, excessive wax or obstruction, presbycusis amount, and difference in hearing acuity between ears. Employee data is used to compute various statistics related to an individual's hearing impairment. Included in the data is noise exposure information, in addition to location, age and sex of the employee. The reports assist nontechnical personnel in interpreting audiometric test results and facilitate review and evaluation by audiologists and physicians.

CHEVRON
STANDARD OIL OF CALIFORNIA

PROGRAM TITLE: Noise Control Guideline No. 3B
Hearing Conservation Surveys

CONTACT: Mr. Stanley H. Judd
Staff Environmental Health and Pollution Engineer
Environmental Health and Toxicology
Standard Oil of California
225 Bush Street
San Francisco, California 94104

I. General Summary

The Hearing Conservation training program prepares Safety Engineers and other personnel to conduct noise level surveys and to assess occupational noise exposure. The training course, designed primarily for internal use within Chevron, focuses on the effects of noise on people, measurement of noise levels, source identification, the physics of sound, exposure time, specialized measurement techniques, and engineering noise control. Upon completion of the training, personnel will be qualified to conduct hearing conservation surveys in compliance with Chevron company practice and the Occupational Safety and Health Act. The intensive study for measuring occupational noise levels emphasizes exposure of personnel and is not intended to provide complete data for engineering design, performance specifications or noise abatement procedures.

While the course varies depending upon the participants and the projected scope of their assignments, the basic program consists of four three-hour sessions with an optional noise control session where necessary. Recommended class size is 8-10 students per instructor, typically from the Environmental Health and Toxicology Department, experienced Safety Engineers, and/or other qualified personnel. Materials for the training program include: a Handbook for Hearing Conservation Surveys, slides, tapes, and various forms and equipment used to measure sound levels.

The primary goal of the program is to instruct personnel to evaluate hazards to hearing and to comply with OSHA regulations. To meet this goal, participants are prepared to measure noise intensity and frequency, evaluate noise exposure time, and maintain adequate records. In addition to the use of slides, tapes, and lecture presentations, field work and "live" practice sessions are conducted in noisy areas for each of the basic activities described above. The program covers theoretical aspects of hearing conservation with the major activities conducted on a practical level to qualify participants to conduct Hearing Conservation Surveys as a key responsibility in their assignments within Chevron.

COLUMBUS AND SOUTHERN OHIO ELECTRIC COMPANY (CSOE)

PROGRAM TITLE: Pesticides; Energy

CONTACT: Mr. Henry L. Schulte, Jr.
Director, Environmental Quality
Columbus and Southern Ohio Electric Company
215 N. Front Street
Columbus, Ohio 43215

I. General Summary

Pesticides:

The Columbus and Southern Ohio Electric Company (CSOE) pesticide program deals principally with Industrial Vegetation Control, Ornamental, Plant and Shade Tree Pest Control, Turf Pest Control, Vertebrate Animal Control, and Mosquito/Housefly Vector Control.

CSOE has two Landscape Horticulturists and one Forester who are Certified Licensed Pesticide Applicators.

Licensed contractors are employed along with company people. The individuals operating Columbus and Southern equipment receive on-the-job training by licensed personnel who also supervise the pesticide work. Regular safety meetings are used to teach safety along with job training utilizing material from the Safety Handbook provided by EPA and USDA along with the Ohio Department of Agriculture Pesticide Regulation Materials.

A procedure in the Company Policy and Procedure Manual, as a result of a combined effort of the licensed applicators and the Environmental Division, not only provides a control of pesticide application, but also provides an opportunity to train and supervise additional people in safe, effective pesticide usage.

Energy:

Specialists working in the Consumer Services Division conduct programs dealing with conserving energy through the use of insulation and the wise use of home appliances and lighting. The titles of several of these programs are:

- * The Facts of Light
- * How Do You Rate? An Energy Quiz

* The Cost of Convenience
* How Much Does It Cost to Operate Your Appliances?
* Checklist for Buying Appliances

The Consumer Services Division conducts programs for grades six through college, special education and adult education classes. They consist of a speaker with class participation and can include demonstrations, slide presentations, visuals, or a combination of any of these techniques.

PROGRAM TITLE: Secondary Wastewater Treatment Plant Operators Training

CONTACT: Mr. J. D. Weinbauer
Project Scientist
Consolidated Papers, Inc.
Wisconsin Rapids, Wisconsin 54494

I. General Summary

This training program was developed and taught by Consolidated's Research and Development Environmental staff. The objective was to familiarize treatment plant supervisors and operators with the principles of biological wastewater treatment and its process control. The course included three days of classroom lecture and discussion, followed by two days of analytical laboratory participation. The agenda included the following:

I. Introduction and physical layout of treatment plant.

II. Process (operation) Control

   A. Loading
   B. Sludge
   C. Biological
   D. Laboratory Instruments and Calibration
   E. Sampling and Monitoring
   F. Polymer Usage and Function
   G. Dewatering Presses
   H. Bulking
   I. Plant Alarms
   J. Odor

III. Analytical Testing

   A. BOD_5
   B. Solids
   C. Sludge Settling

IV. Laboratory (operator participation)

V. Record Keeping

The course emphasis was on normal activated sludge and extended aeration operation and fundamentals. The operators were also instructed on upset cause and effect conditions and appropriate resolution.

A full day was spent on treatment plant microbiology. This included an introduction to the microscope, slide preparation, quantitative and qualitative microscopic examination and its application for process control.

All biological and analytical testing was done on actual pilot plant samples.

The participant's performance was evaluated based on the following criteria:

1) Worksheets
2) Problem Solving
3) Calculations
4) Laboratory Performance
5) Applied Knowledge

The course is evaluated in the following manner:

1) Participant Critique
2) Plant Performance

DUQUESNE LIGHT COMPANY

PROGRAM TITLE: The Beaver Valley Emergency Preparedness Plan (EPP)

CONTACT: Mr. S. L. Pernick, Jr.
Manager, Environmental Affairs
Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

I. General Summary

The Beaver Valley Emergency Preparedness Plan (EPP) was submitted for public dissemination on January 30, 1976 as a cooperative plan to be implemented in the event of an uncontrolled release of radioactive materials from the Beaver Valley Power Station at Shippingport, Pennsylvania. The EPP was developed in conjunction with local agencies which have agreed to share emergency responsibilities if such an event were to occur. These agencies include the Local Civil Defense Authority, the Pennsylvania Civil Defense Agency, the State Bureau of Radiological Health, the State Police, Duquesne Light Company, local businesses, the Coast Guard and the Corps of Engineers.

The two major goals of the Emergency Preparedness Plan are: 1) To protect the health and safety of the general public, and 2) to establish control of an emergency situation in such a manner as to minimize the effect on the safety and welfare of all individuals.

To meet these goals, Duquesne Light developed a plan which delineates areas of responsibility, as well as procedures for assessment and control of an emergency situation involving radioactive materials. In addition to multiple safeguard systems within the physical plant, on-site personnel are trained to deal with accidents that could occur. The on-site personnel receive training in fire fighting, first aid, radiation monitoring, communications, application of protective clothing and equipment, and in personal (or group) radiation procedures and guidelines.

Local fire departments are also offered specialized training in methods of controlling fires involving high voltage electrical equipment, and fires involving radioactive materials. Part of the training involves on-site drills to establish a familiarity with the location and types of equipment available.

Staff at the Aliquippa Hospital are provided with instructional drills for the admittance of contaminated victims. These drills include local ambulance services.

The above procedures and training programs are in addition to the extensive preparation of Duquesne Light plant operators in preparation for the operation of a nuclear power generation plant. Plant operators receive two years of training, followed by qualifications examinations administered by the Nuclear Regulatory Commission.

The Beaver Valley Emergency Preparedness Plan was developed in accordance with Appendix E to Title 10, Code of Federal Regulations, Part 50. A summary of the EPP is available to the public for review at the Public Library, Beaver, Pennsylvania. The summary and additional implementation procedures have been reviewed by the Nuclear Regulatory Commission. Revisions are made, as appropriate to keep the plan current.

PROGRAM TITLE: Career Development and Registration Program

CONTACT: Mr. Jack T. Harroun, Administrator
Environmental Management Association
University of Illinois
1501 S. Oak Street
Champaign, Illinois 61820

I. General Summary

The Environmental Management Association is the trade association/professional society that represents the environmental sanitation maintenance profession of industrial sanitation. As defined by EMA, sanitation means that field of professional activity concerned with the management of the work and product environments for the purpose of protecting health and safety and sustaining product quality within the inside or outside of buildings. Over the years, general sanitation duties and responsibilities have expanded to include air, water, noise, solid waste, waste pollutants, safety, health, energy, etc. For this reason, EMA consists of five subsidiary organizations:

- * Building Service Managers Institute
- * Professional Sanitation Consultants Service Institute
- * Food Sanitation Institute
- * Health Care Facilities
- * Sanitation Suppliers and Contractors Institute

One of the stated objectives of this Association is to actively establish, conduct, participate and/or cooperate in educational forums, seminars, workshops or academic endeavors related to sanitation. It is to achieve this objective that the Career Development and Registration Program was developed.

The intent of this program is to encourage members to upgrade their skills. It is also a means for standardizing some experience and academic skill levels among members so that a greater mobility can be achieved within the profession.

There are four levels, I through IV, for a Registered Manager or Consultant of Environmental Sanitation. A member must take college credits in varying numbers in each of five areas:

- Communications
- Business
- Personnel
- General Study
- Sanitation Technology

In order to be able to test for a Level I, for example, a total of 50 credit hours must be completed. Members can acquire these credit hours at night school, correspondence, junior college or at a college or university.

II. Program Highlights

EMA's program has some interesting and praiseworthy features. The Association believes strongly in the value of education to its members and hence has designed this rather unique career development program. One outstanding accomplishment within the program has been the development of a testing program. Each level has a testing program of 300 questions covering management, health care technology, basic microbiology, food technology and food safety, sanitation technology, safety and fire protection technology, pest control technology, grounds operation technology and building operation technology, i.e., boilers, plumbing, carpentry.

W. R. GRACE AND COMPANY

PROGRAM TITLE: Energy Conservation

CONTACT: Mr. Klaus Scheye, Vice President
Technical Services Division
W. R. Grace and Company
Grace Plaza
1114 Avenue of the Americas
New York City, New York 10036

I. General Summary

The Energy Conservation Manual (E-CON) was issued to all company managers in January, 1977. The expressed objective of this Manual is to provide every manager with a basic operating tool for energy conservation. Energy conservation is seen as a new profit potential and every manager must develop his own energy-conservation program. The E-CON Manual becomes the means to that end.

The Manual is divided into four basic sections:

Section I. Benchmark Energy Survey/Analysis
  - A. Purchased Energy
  - B. Generated Energy
  - C. Recycled Energy
  - D. Total Energy

Section II. Annual Survey and Reporting Procedures

Section III. Finding and Plugging Energy Leaks

Section IV. Energy Waste Prevention

II. Program Highlights

This 'how-to' Manual is extremely comprehensive in scope as its size (almost three inches thick) would suggest. It has an additional advantage of being presented in three-ring binder format which allows for necessary updating.

The bulk of the Manual (Section IV) complements the procedural activities by "providing expert references on how to accomplish these savings". This section includes "selected articles, charts, tables and procedures that represent the top expertise and the broad experiences of scores of energy-conservers representing many industries".

A partial list of topics included in Section IV, 'Energy Leak Prevention', follows. The total list contains twenty-six topics and ninety-seven subtopics.

- * Air Conditioning
  - Heat Recovery Devices for Air Conditioning
  - Reduce Air Conditioning During Non-Working Hours
- * Boilers
  - Charting Improved Boiler Efficiency
  - Keep Boiler Tubes Clean
- * Electrical Consumption
  - Correct Low Power Factors
  - Living With the Electrical Crisis
- * Insulation
  - Insulate Bare Steam Lines
  - Improve Furnace Insulation
- * Lighting
  - Reduce Non-Essential Lighting
  - Upgrade Efficiency of Incandescent Light Sources

GULF ENERGY AND MINERALS COMPANY

PROGRAM TITLE: Anti-Pollution Safety Device Training

CONTACT: Mr. H. E. Braunig, Jr.
Manager, Environmental Affairs
Production Department
Gulf Energy and Minerals Company
P.O. Box 2100
Houston, Texas 77001

I. General Summary

The Anti-Pollution Safety Device Training Program was developed by Gulf's South and East Offshore Divison specifically to comply with federal regulations (Revised OCS Order #8). Specific training requirements relative to offshore personnel contained within the Revised Order are to be met by this program. However, the Gulf belief that training of their field personnel is essential to the efficient and effective conduct of their offshore operations led them to broaden their training requirements in two ways:

1) rather than concentrating solely on teaching individual safety devices, a systems approach was taken. That is, the relationship between the safety devices and the entire surface system was the focus.
2) the scope of the program was broadened to include training on the principle of operation of production equipment, the care and maintenance of firefighting equipment and crane operation, maintenance and safety.

The program is designed for field personnel who work offshore in installing, inspecting, testing and routinely maintaining safety and pollution control equipment. Throughout the South and East Offshore Division, Gulf has the equivalent of 73 full-time employees working on safety and anti-pollution matters. A typical platform on which these employees work is equipped with over 200 safety devices.

Basically, the design and development of the Anti-Pollution Safety Device Training Program is the result of the efforts of an experienced company engineer and a production superintendent with 13 of his 27 years of experience spent offshore. The overall cost to develop the program was approximately $260,000. The training cost per person is about $1,500 for a company employee and $1,200 for a contract person.

Since the first pilot training session held in January 1977, over 200 employees of Gulf and their contracting organizations have participated in the program.

II. Program Highlights

The noteworthy characteristics of this program are several:

- The program format spans a seven-day period that entails approximately 73 hours of training.
- The method of instruction includes lectures, slide tape presentations, hands-on training, in addition to a training manual.
- Workshop training aids include the platform simulator (a scale model of the equipment typically used in an offshore platform) as well as many plastic and cut-away models of safety and production equipment.
- Sixty-three (63) individual courses are included in the program schedule.
- The nine employees scheduled per class attend on their regularly scheduled work days.
- Pre- and post-tests (written) are used as well as a final qualification test which includes both a written and hands-on test.

GULF TRADING AND TRANSPORTATION COMPANY

PROGRAM TITLE: A Bad Day at Bunker Point (Oil Spill)

CONTACT: Captain E. Marcus
Manager of Safety and Environmental Protection
Gulf Trading and Transportation Company
Marine Department
Philadelphia, Pennsylvania 19101

I. General Summary

A Bad Day at Bunker Point is the first phase of a four-part program designed to improve existing oil spill policies and procedures. This seminar utilizes multimedia, role-playing exercises designed to sensitize key ship personnel and terminal managers to the problems and responsibilities of doing business in today's world. Other phases in this program include visits by the safety and environmental inspection team to all of the company's 60 major terminals to evaluate operational procedures and equipment and to recommend needed changes and updating. Later, the inspection team will make periodic but unscheduled spot-checks of these terminals to make sure previous recommendations have been carried out and to insure that contingency plans are changed as technology improves. The final element of the program is establishment of a 'fast reponse team' made up of representatives of marine operations, engineering, public relations, environmental, legal, insurance and personnel departments to assist terminal personnel in the event of a major oil spill.

Preparation of the seminar began in January 1975. It was designed for only one problem - oil spillage. The educational objectives are two:

1) to train and educate managers regarding the significance of oil spills, why they occur and how to avoid them;

2) to teach employees what to do should an oil spill occur.

II. Program Highlights

The fictitious town of Bunker Point is in a remote, idyllic coastal community where tourism and fishing are mainstays of the economy. A fictitious transshipment terminal is located there. With this setting as a backdrop, the seminar consists of role-playing exercises in which managers are chosen from the audience to play the role of the terminal manager who must deal with a major oil spill, hostile community groups, environmentalists and government officials. A panel of experts criticize the performance of each manager in every situation and prompts the audience to come up with better solutions.

This type of stimulating experience and involvement results in positive thinking on the part of the audience. The relevance of the problems presented is obvious because each one was patterned after a real incident in Gulf's history.

* Over 700 people have attended the seminar; they include senior ship's officers, terminal and refinery managers and others who are responsible for the storage and transportation of oil.

* "Gulf is so committed and dedicated to protecting the environment and its employees, that this program is outside of the terminal/refinery budgets."

* Gulf believes it has an obligation to train its managers not only to run a plant but to become increasingly involved with community problems and the environment.

PROGRAM TITLE: Inter-Noise 78

CONTACT: Mr. Malcolm J. Crocker
Vice President, Communications
Institute of Noise Control Engineering
Ray W. Herrick Laboratories
Purdue University
West Lafayette, Indiana 47907

I. General Summary

The Institute of Noise Control Engineering is a non-profit organization for professional engineers who are concerned with noise control. The Institute organizes conferences and seminars each year. The 1978 international conference, Inter-Noise 78 is held in May. The emphasis throughout this conference is on practical solutions to important noise control problems. It also includes technical sessions consisting of invited and contributed presentations on world-wide noise control technology, as well as noise clinics and an exhibition of the latest equipment and instrumentation for noise control. A series of lectures on various aspects of "Designing for Noise Control" is presented by recognized specialists in the field.

Last year's conference, Noise-Con 77 had as its main theme: transportation noise. Thirty-six invited lectures were given and about 300 people attended. Immediately before the conference an intensive short course was held on the techniques of noise control. Its theme was in-plant noise, machinery noise, transportation noise, measurements and facilities for noise control. The short course provided the information necessary to develop effective and economical methods for controlling noise. The Institute conducts another short course prior to Inter-Noise 78 in San Francisco.

PROGRAM TITLE: Microbiology

CONTACT: Dr. J. John Keggi
Director of Continuing Education
The Institute of Paper Chemistry
P.O. Box 1039
Appleton, Wisconsin 54911

I. General Summary

The objectives of this course are to familiarize the participant with basic microbiological techniques and to provide an understanding of their application to problems of particular concern to the pulp and paper industry. Microbiology is an area of study that is largely defined by its methodology and these techniques are not readily acquired from textbooks or standard methods manuals. Increased reuse of water within the mill and in effluent treatment have brought the mill technical staff into contact with microbiological problems that require assay skills with which few have had prior experience. Also, the training will serve to extend the usefulness of facilities and equipment that have been obtained to carry out certain specific required assays.

The course is designed for those members of the technical staff that are becoming involved in microbiological methodology but who have not had prior microbiological training. It will be of particular value to the laboratory personnel directly responsible for carrying out such procedures.

The course consists of combined lecture, demonstration and laboratory practice in microbiological techniques. A general presentation of the major microorganism forms and their characteristics are given to provide a base for the techniques to be covered.

The course outline includes:

General Microbiology
- Organism forms
- Growth characteristics

Microscopy

- Application
- Operation
- Specimen preparation
- Staining

Aspectic Technique

- Sanitation
- Sterilization
- Equipment
- Sampling
- Culturing

Culture Media

- Preparation
- General types
- Selective types

Counting Procedures

- Plating
- Direct
- Filtration
- MPN

Microbe Assays

- Total Counts
- Anaerobes
- Sulfur reducers
- Coliforms
- Biocides

Throughout the course the applications of the techniques under discussion will be from the viewpoint of how they are applied to specific areas of the papermaking process.

THE INSTITUTE OF PAPER CHEMISTRY

PROGRAM TITLE: Water Quality and Aquatic Ecology

CONTACT: Dr. J. John Keggi
Director of Continuing Education
The Institute of Paper Chemistry
P.O. Box 1039
Appleton, Wisconsin 54911

I. General Summary

The objectives of this course are to introduce the technical person involved in environmental control to the fundamentals of aquatic ecology. The principle problems associated with pulp and paper mill effluents are defined in regard to the major types of receiving waters. A set of guidelines, from which the technical person can judge the relative worth of perspective water quality research will be developed. A basic understanding of the aquatic environment and how such information can be used is also discussed.

Some of the topics included in the Course Outline are:

- What is water quality?
- Ecology and structure of aquatic systems
- Effects of pulp and paper making wastes upon the receiving stream
- Anticipated environmental responses to process changes and treatment upsets
- Developing a comprehensive sampling program

PROGRAM TITLE: Water and Wastewater Control

CONTACT: Dr. J. John Keggi
Director of Continuing Education
The Institute of Paper Chemistry
P.O. Box 1039
Appleton, Wisconsin 54911

I. General Summary

The objectives of this course are to familiarize the participant with certain principles of the water environment and of waste treatment systems, and to illustrate how these principles may be used by the technical man in the paper industry. An effort is made to expand the chemical awareness and know-how which are essential to any long-term approach to understanding and controlling our effect on the environment, especially in relation to the pulp and paper industry

This course is aimed at biologists, chemists, scientists, engineers and managers of the pulp and paper and allied industries who are concerned with the water environment. It also attracts the interest of nonscientists who must deal with environmental problems at other levels.

This course is structured around the theory and technology of treatment processes used for pollution abatement with special emphasis on the effluents from the pulp and paper industry. The principles are treated in sufficient detail to provide an understanding of the application to practical problems. Covered material also includes the nature and rationale of biological monitoring techniques as they are used to judge the ultimate results of the waste treatment activities.

The material is covered in a series of lectures and presentations by Institute staff members and outside speakers. The active participation of the attendees in the discussions is expected. Each participant is encouraged to bring forward specific problems for discussion.

Some of the topics included are:

* Analytical Methods

* Water and Water Borne Discharges

* Outplant Control Methods

* Inplant Control Methods

MINNESOTA MINING AND MANUFACTURING
(3M Company)

PROGRAM TITLE: Commute-A-Van

CONTACT: Mr. Henry G. Owen
Public Relations Specialist
Environmental Engineering and Pollution Control
3M Center
St. Paul, Minnesota 55101

I. General Summary

The 3M Commute-A-Van Program is a system whereby the 3M Company furnishes a standard 12 passenger van to an employee willing to take at least eight other employees to and from work. The employee driver is compensated by riding at no charge, by having personal use of the van at a reasonable mileage rate and by the fares of any passengers beyond the minimum of eight.

Generally, the goals of the pilot program begun in 1973 were to determine:

1) would such a program work;
2) how much would it cost;
3) whether user income would be sufficient to cover expenses.

The program attempted to prove that the number of autos used for the work trip could be significantly reduced, thereby alleviating congestion and reducing the demand for parking. Environmental matters such as air pollution and energy savings were also concerns in the design of this program.

The facts regarding the expanded program in 1977 indicate the overall success of the program.

1977 3M COMMUTE-A-VAN FACT SHEET

CURRENT NO. OF VANS	92
AVERAGE DAILY ROUND TRIP MILEAGE PER VAN	49
AVERAGE OCCUPANCY PER VAN	11.1
PARKING STALLS ELIMINATED TO DATE	650
EST. CAPITAL SAVINGS FOR PARKING FACILITIES	$2.5 million
AV. NO. OF VEHICLES REPLACED PER VAN	7

A summary of the overall benefits of the program include:

Benefits to 3M:

- reduced congestion at 3M installations
- reduced demand for parking
- reduced capital expenditures for auto-related facilities
- more efficient use of land at 3M installations

Benefits to Users:

- save money
- reduced risks and tension of commuting
- greater availability of car for use by family members, thereby increasing their mobility and social-economic opportunities

Benefits to Non-User:

- reduced congestion and parking demand in and around 3M installations

Benefits to General Public:

- reduced congestion on streets and highways
- reduced land use for auto-related facilities
- positive effect on the environment - less air and noise pollution
- reduced energy consumption

The second Rider Survey is another indication of success:

1976 3M RIDER SURVEY

* Number of usable responses - 566
* 80% said it's more convenient than former mode of transportation.
* 97.6% intended to stay with the program permanently.
* 66% said the vehicle left at home was used less frequently.
* Average increase in travel time was less than 10 minutes per trip.
* More than half the patrons have been in program over two years.
* On the average, 73.7% of the riders use van service every day.
* Shared ride programs have increased average vehicle occupancy from 1.24 in 1970 to 1.60 currently.

II. Program Highlights

The most impressive aspect of this program is the savings achieved in each of three areas: miles driven, gallons of gasoline and tons of pollutants removed.

SAVINGS IN 3M COMMUTE-A-VAN PROGRAM

	Vehicle Miles Saved Annually	Average Gallons Saved Annually	Tons of Pollutants Removed Annually
25 Vans - 1973	667,000	55,000	107
52 Vans - 1974	1,400,000	114,000	223
65 Vans - 1975	1,800,000	143,000	279
75 Vans - 1976	2,000,000	165,000	322
92 Vans - 1977	2,500,000	202,400	390
TOTALS TO DATE	8,367,000	679,400	1,321

3M's "Commute-A-Van" Status Report has been used to help answer requests for information regarding the specifics of van-pooling from more than 1,000 prospective van-poolers.

MINNESOTA MINING AND MANUFACTURING
(3M Company)

PROGRAM TITLE: Energy Conservation Program

CONTACT: Mr. Henry G. Owen
Public Relations Specialist
Environmental Engineering and Pollution Control
3M Center
St. Paul, Minnesota 55101

I. General Summary

This program is one of two award-winning programs developed by 3M currently being used in domestic as well as the overseas activities of the Company.

3M's efforts in energy conservation began in 1971, when skyrocketing energy costs for the current decade were first predicted. The Company designed a three-phase energy-conservation program, which first focused on developing new operating criteria that would result in immediate energy savings, including such basics as lowering thermostats in all Company facilities.

During the second phase, when the emphasis was on establishing design and conservation criteria, engineering standards aimed at saving energy were drawn up and applied to new construction at Company facilities. 3M has shared its engineering standards for energy conservation with 8,000 other organizations, including businesses, hospitals, schools, universities and government agencies.

In the program's third phase, energy audits aimed at longer-term savings will identify opportunities for modification in manufacturing processes and buildings.

Another development growing out of 3M's conservation program is the 'Minnesota Plan', which is being sponsored by a business, labor and agricultural coalition in that state and which would provide federal tax credits for energy-conservation expenditures.

II. Program Highlights

3M's innovations in energy conservation, plus modification of manufacturing processes, have produced an annual energy savings of 17%, or roughly the equivalent of 16 million gallons of oil. The Company's goal is an additional savings of 13% by 1978, bringing to 30% the total savings in energy consumption compared with 1973, the base year.

Many of the energy standards for energy conservation developed by 3M under the second phase have been adopted by the General Services Administration (GSA), Department of Defense and the Postal Service for U.S. government construction projects.

The Company's energy programs have been recognized by Business and Society Review which last March gave 3M a Social Responsibility Award as a result of energy conservation efforts in 1975. 3M was the first company to receive an Industrial Conservation Award from the Federal Energy Administration. The Company's programs also have received recognition in Canada, United Kingdom and Japan.

MINNESOTA MINING AND MANUFACTURING
(3M Company)

PROGRAM TITLE: Pollution Prevention Pays (3P)

CONTACT: Mr. Henry G. Owen
Public Relations Specialist
Environmental Engineering and Pollution Control
3M Center
St. Paul, Minnesota 55101

I. General Summary

Pollution Prevention Pays (3P Program) is a companywide effort intended to benefit both the environment and 3M by encouraging positive action to reduce pollution potential in product or process development, in facility design and in production.

The antithesis of pollution control costs money is pollution prevention pays. This concept forms the basis of the 3P Program. The impact of "pays" is very important. The company has found that pollution prevention pays:

- in a better environment;
- conserved natural resources;
- development of new technology;
- reduced capital and operating costs.

The program has been extended to all 3M laboratory, manufacturing and engineering employees. Emphasis is focused on the early stage of product or process development and problem analysis.

The overall objective of the 3P Program is to recognize and promote the concept of pollution prevention at the source on a continuing basis. Personal recognition for those responsible for pollution prevention innovation perhaps is the single most important part of the program. The 3P Program solicits all employees to suggest how to prevent pollution at the source and to obviate the need to build pollution control facilities.

In the United States, the program is monitored by the Environmental Engineering and Pollution Control (EE and PC) organization, but it is conducted by a 3P Coordinating Committee. This group represents the Company's engineering, manufacturing and laboratory organizations. It means that 3P is conducted by and for the operating divisions. The success of the program reflects the fact that 3P is a cooperative effort and not a management edict. There are four stages to the program at the plant level:

1) awareness - this phase uses a slide presentation, brochures, posters and articles in employee newspapers to create a basic understanding of program concepts.

2) implementation - the plant engineer assigned local responsibility for 3P organizes a coordinating committee of engineering and technical people to assist in evaluating contributions.

3) measurement - contributions are measured according to two primary and three secondary guidelines. Primary guidelines are:

   - The project must eliminate or reduce actual or potential pollution;
   - It must have some potential monetary benefit to 3M.

   Secondary criteria are:

   - The project must have some additional environmental benefit, such as energy consumption reduction;
   - It must represent a technical accomplishment, innovative approach or a unique design in meeting its objective;
   - The project must have produced results; no recognition is given for ideas or suggestions which are not implemented.

4) recognition - is intended for employees who make a working contribution toward eliminating a pollution problem. Managers are not eligible unless they meet this criteria for 'hands-on' activity.

II. Program Highlights

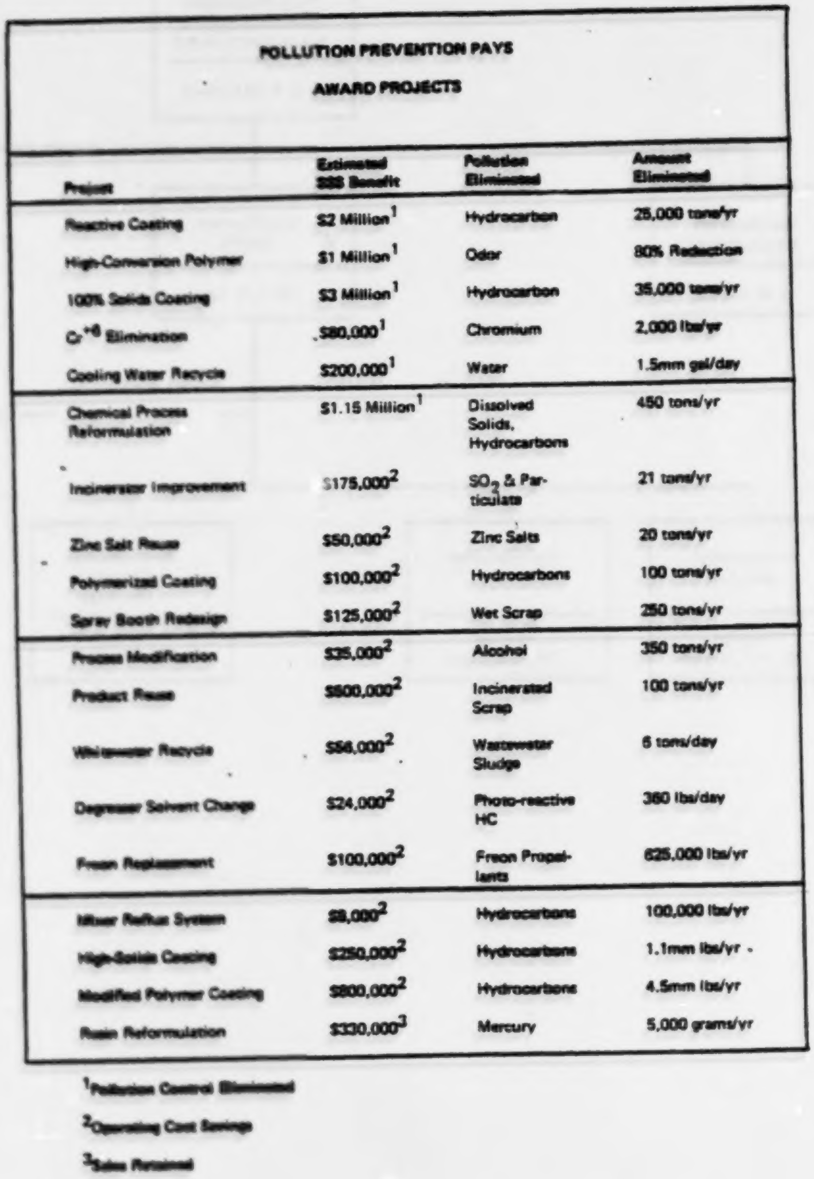
Since April, 1975, the Coordinating Committee has judged 52 projects which were nominated for the 3P Award. Of these, 30 were approved.

* The 30 projects cited for awards have eliminated from our environment the equivalent of:

  - 73,000 tons of air pollutants annually;
  - 500 million gallons of polluted wastewater annually;

2,800 tons of sludge annually.

- In addition, these projects have over the past two years produced a total estimated savings to 3M totaling about $14 million. The savings were from process and product improvements and eliminated or deferred spending for pollution control equipment.



POLLUTION PREVENTION PAYS

AWARD PROJECTS

Project	Estimated $$$ Benefit	Pollution Eliminated	Amount Eliminated
Reactive Coating	$2 Million[1]	Hydrocarbon	25,000 tons/yr
High-Conversion Polymer	$1 Million[1]	Odor	80% Reduction
100% Solids Coating	$3 Million[1]	Hydrocarbon	35,000 tons/yr
Cr^{+6} Elimination	$80,000[1]	Chromium	2,000 lbs/yr
Cooling Water Recycle	$200,000[1]	Water	1.5mm gal/day
Chemical Process Reformulation	$1.15 Million[1]	Dissolved Solids, Hydrocarbons	450 tons/yr
Incinerator Improvement	$175,000[2]	SO_2 & Particulate	21 tons/yr
Zinc Salt Reuse	$50,000[2]	Zinc Salts	20 tons/yr
Polymerized Coating	$100,000[2]	Hydrocarbons	100 tons/yr
Spray Booth Redesign	$125,000[2]	Wet Scrap	250 tons/yr
Process Modification	$35,000[2]	Alcohol	350 tons/yr
Product Reuse	$500,000[2]	Incinerated Scrap	100 tons/yr
Whitewater Recycle	$56,000[2]	Wastewater Sludge	6 tons/day
Degreaser Solvent Change	$24,000[2]	Photo-reactive HC	360 lbs/day
Freon Replacement	$100,000[2]	Freon Propellants	625,000 lbs/yr
Mixer Reflux System	$8,000[2]	Hydrocarbons	100,000 lbs/yr
High-Solids Coating	$250,000[2]	Hydrocarbons	1.1mm lbs/yr
Modified Polymer Coating	$800,000[2]	Hydrocarbons	4.5mm lbs/yr
Resin Reformulation	$330,000[3]	Mercury	5,000 grams/yr

[1] Pollution Control Eliminated

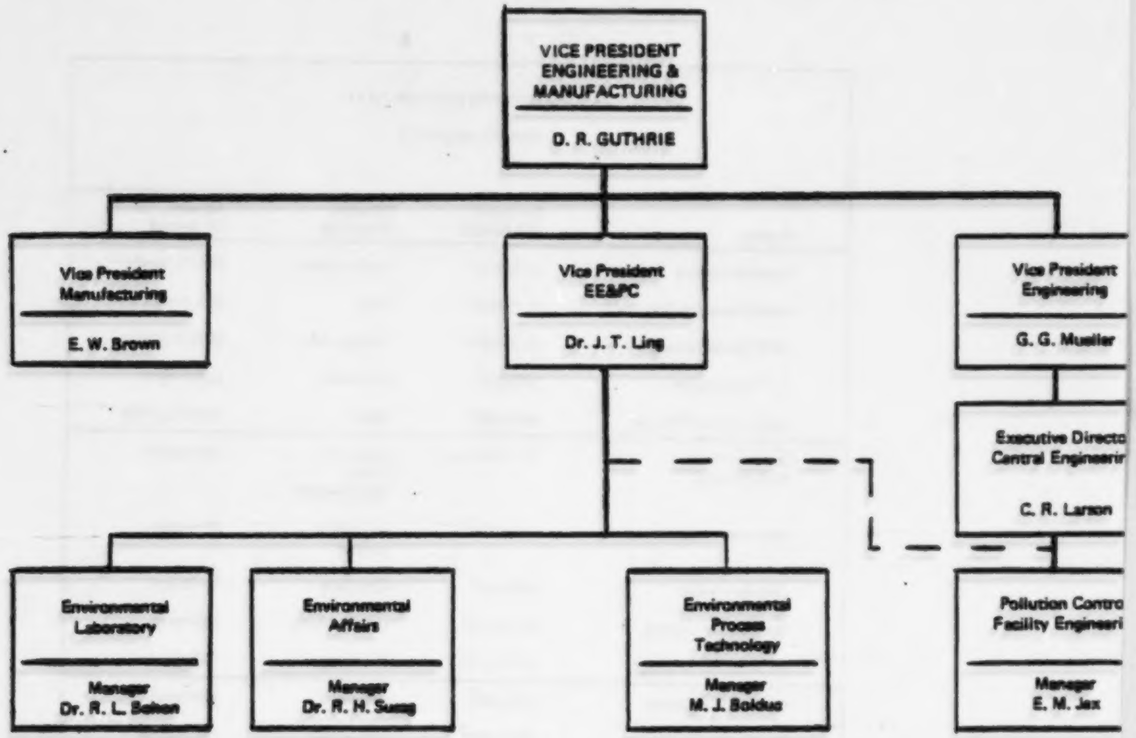
[2] Operating Cost Savings

[3] Sales Retained

Chart shows early 3P award-winners (through 1976)

Table 2. Organization of the 3M Environmental Group. The three sections within Environmental Engineering and Pollution Control (EE&PC) work closely with Pollution Control Facility Engineering, the fourth component of the environmental group, which is within the corporate engineering structure. The dotted-line relationship is indicated.

3M environmental group organization


VICE PRESIDENT ENGINEERING & MANUFACTURING
D. R. GUTHRIE
Vice President Manufacturing
E. W. Brown
Vice President EE&PC
Dr. J. T. Ling
Vice President Engineering
G. G. Mueller
Executive Directo
Central Engineerir
C. R. Larson
Environmental Laboratory
Manager
Dr. R. L. Bohon
Environmental Affairs
Manager
Dr. R. H. Susag
Environmental Process Technology
Manager
M. J. Bolduc
Pollution Contro
Facility Engineeri
Manager
E. M. Jax

PROGRAM TITLE: Modern Refining Technology

CONTACT: Mr. D. P. Heath, Coordinator
Environmental Conservation
Mobil Oil Corporation
150 East 42nd Street
New York City, New York 10017

I. General Summary

The course in Modern Refining Technology is regularly conducted by Mobil Research for Mobil employees from all over the world. The environmental portion of the program takes one day of this two-week course. Topics covered include:

Environmental Control
Solid Wastes
Air Quality
Noise Control

MOBIL OIL CORPORATION

PROGRAM TITLE: Oil Spill Prevention and Control Course

CONTACT: Mr. D. P. Heath, Coordinator
Environmental Conservation
Mobil Oil Corporation
150 East 42nd Street
New York City, New York 10017

I. General Summary

Mobil developed an Oil Spill Prevention and Control Course in 1972, which was used extensively through 1974. In 1975, Texas A&M made available a similar course, which Mobil now uses for U.S. employees. Mobil continues to conduct their own course for non-U.S. employees.

The objectives of the Texas A&M Oil Spill Control Course are nine:

1) recognize potential spill situations;
2) modify and update existing contingency plans to enhance their effectiveness;
3) establish a supervisory team to implement the contingency plan;
4) organize, train, and direct a response team;
5) recommend and direct the use of proper oil spill control equipment such as skimmers, booms, sorbents, and other tools;
6) preplan arrangements for additional support equipment and supplies not readily available;
7) establish plans for an effective communications network during a spill;
8) meet legal requirements for properly reporting oil spills;
9) effectively handle the public relations aspects and be aware of the legal implications at a spill scene.

At least twenty (20) sessions of the Oil Spill Control Course are offered each year. Each five-day course includes hands-on training, classroom instruction, and student response to a simulated oil spill. The majority of the instructors are from the Oil and Hazardous Material Control Training Division of the Texas Engineering Extension Service. Programs are frequently augmented by guest lecturers from industry and government agencies, including the Coast Guard and EPA.

The Mobil Oil Spill Prevention and Control Course is held at least once a year, most recently in Southern France and in Singapore in February. The topics covered in this five-day course include:

* Prevention - Causes of Spills
  - Leaks
  - Mechanical Failures
  - Natural Forces
  - Highway Accidents
  - Service Stations
* Oil Water Separators
  - Types of Equipment
  - Operation
  - Drainage
* Contingency Planning
* Time Study
* Spill Sampling and Analysis
* Skimmers, Types and Uses
  - Other Oil Removal Equipment
  - Shoreline Clean-Up Equipment
* Offshore Spills

The presentations include videotape segments, movies, group discussions and question/answer sessions. Practical aspects of oil spill control are emphasized by a day and a half of 'hands-on' exercises.

PROGRAM TITLE: Management of Noise Control in Industrial Plants

CONTACT: Mr. Lewis H. Bell, Vice President
Harold R. Mull, Bell and Associates
181 Main Street
Norwalk, Connecticut 06851

I. General Summary

This two-day seminar presents a detailed analysis of noise regulations and step-by-step techniques for achieving compliance in the most cost-effective manner. The first day's topics include:

- Analysis of New OSHA Noise Regulations
- State and Federal Enforcement
- Citations
- Cost of Compliance
- Hearing Protection
- The Compliance Plan

The second day consists of the development and analysis of a complete program for a hypothetical factory.

This seminar is designed for plant managers, OSHA and EPA compliance personnel and industrial hygienists. It has been presented to a wide variety of audiences including universities, corporations, industrial associations and industrial societies.

Participants will be involved in group discussions, role-playing situations and problem-solving related to a specific project. Workbooks and manuals are incorporated into the program as well as slide/tape presentations and films.

II. Program Highlights

This seminar is designed to meet the requirements of the group. So while the basic principles discussed are standard, the applications and techniques are designed for each group.

PROGRAM TITLE: Noise Control in Manufacturing

CONTACT: Mr. Lewis H. Bell, Vice President
Harold R. Mull, Bell and Associates
181 Main Street
Norwalk, Connecticut 06851

I. General Summary

The Noise Control in Manufacturing Workshop is a concentrated training course designed to provide practical information about industrial noise control and guidelines for establishing a compliance plan to meet current federal regulations.

Participants work on simulated noise control problems from diagnostic measurement and analysis through remedial design. Attention is focused on alternative measures such as administrative controls and the use of hearing protection to reduce personnel exposure.

The workshop theme emphasizes utilization of all available alternatives to assure meeting compliance where engineering controls are not feasible. Each participant is encouraged to bring pertinent data from any specific noise control problem for discussion and evaluation.

This three-day workshop is divided into six sessions. Some of the topics include:

- Basic Physics of Sound
- Sound Propagation
- Major Sources and Character of Industrial Noise
- How to Control Industrial Noise
- Reverberation Control
- Vibration Control
- Methods of Noise Measurements
- Establishing Compliance Plans
- External Environmental Noise Pollution and Its Control

II. Program Highlights

One session is devoted entirely to a laboratory workshop. Noise measurement procedures along with diagnostic methods are illustrated with the latest analysis equipment. The participants are separated into working groups and confronted with typical noise control problems. Noise level surveys and analyses are made, and then noise reduction measures are selected or designed by the group. Solutions are critiqued by the entire group.

The workshop text, Fundamentals of Industrial Noise Control, was written by Mr. Lewis Bell, Vice President of the firm. It is described as a practical text written for the plant or safety engineer who has the task of reducing plant noise in order to comply with OSHA regulations. The book is a guide to industrial noise control with many actual case histories and illustrations from various industries.

Programs like this one are tailored specifically to meet the needs of the group. So while the principles discussed are standard, the applications and techniques are designed for each group.

NATIONAL COUNCIL OF THE PAPER INDUSTRY
FOR AIR AND STREAM IMPROVEMENT (NCASI)

PROGRAM TITLE: Analytical Procedures for Bacteriological Analysis of Water and Wastewater

CONTACT: Dr. Isaiah Gellman
Executive Vice President
NCASI
260 Madison Avenue
New York City, New York 10016

I. General Summary

This audio visual training program, prepared by NCASI, is the second in a series. It teaches the techniques for and improving the conduct of bacteriological testing of mill waters and wastewaters.

The program is divided into eight segments using color filmstrips and tapes. The series contains:

* Introduction to Bacteriological Analysis
* Sample Collection and Handling
* Fundamental Laboratory Procedures
* The Serial Dilution Technique
* The MF Test for Total Coliform
* The MF Test for "Fecal" Coliform
* Aseptic Inoculation Techniques
* Differentiation of the Coliform Group

A training manual describes the program, contains supplemental information and copies of pertinent tables. This program is available to members and non-members, regulatory agencies and educational institutions.

NATIONAL COUNCIL OF THE PAPER INDUSTRY
FOR AIR AND STREAM IMPROVEMENT (NCASI)

PROGRAM TITLE: Analytical Procedures for Measurement of Suspended Solids, Settleable Solids, Turbidity and BOD.

CONTACT: Dr. Isaiah Gellman
Executive Vice President
NCASI
260 Madison Avenue
New York City, New York 10016

I. General Summary

This audio visual training program is available to members of the National Council of the Paper Industry for Air and Stream Improvement, Inc., non-members, regulatory agencies and educational institutions. It is the first in a series of NCASI audio visual training aids.

The program consists of the following seven color filmstrips and accompanying tapes containing over 500 individual frames and two hours of narration:

- Suspended Solids Analysis
- Settleable Solids Analysis
- Turbidity Analysis
- BOD--Theory and Application
- BOD--Direct Dilution Technique and Factors Affecting BOD Test
- BOD--Mechanics of Test
- BOD--DO Analysis and Data Handling

A training manual describes the program and contains worksheets and charts to be used as part of the program.

NATIONAL COUNCIL OF THE PAPER INDUSTRY
FOR AIR AND STREAM IMPROVEMENT (NCASI)

PROGRAM TITLE: Principles and Procedures for Water and Wastewater Color Measurement

CONTACT: Dr. Isaiah Gellman
Executive Vice President
NCASI
260 Madison Avenue
New York City, New York 10016

I. General Summary

This audio visual training program is the third in a series developed by the National Council of the Paper Industry for Air and Stream Improvement, Inc. It is designed to teach the techniques for and improving the conduct of Color Measurement of mill waters and waste waters.

The program is divided into five segments using color filmstrips and tapes:

- Electromagnetic and Visual Attributes of Light and Color
- The Principles of Spectroscopy
- Pulp and Paper Mill Effluent Color
- Fundamental Laboratory Procedures for Color Measurement--Sample and Instrumentation Preparation
- Fundamental Laboratory Procedures for Color Measurement--Absorbance Measurement

Ten training manuals are included which describe the complete presentation. The entire program is available to members, non-members, educational institutions and regulatory agencies.

NATIONAL WATER WELL ASSOCIATION

PROGRAM TITLE: Water Treatment and Purification

CONTACT: Ms. Kathy Butcher
Director, Education/Convention
National Water Well Association
500 W. Wilson Bridge Road
Worthington, Ohio 43085

I. General Summary

This is a five-lesson correspondence course concerning water treatment and purification. The objectives of the course lessons are to discuss techniques in making water safe and clean. It highlights four major water problems and explores the methods for treating chemical substances and pathogens that get into water. Iron water, sulphur water, acid water, strange tastes and odors are didactically treated in the text of the correspondence lessons.

The program is designed for contractors and water systems managers. Although the language in the course is somewhat technical it can be understood by village management personnel or small city water distribution managers.

II. Program Highlights

Several of the topics presented indicate the nature of this correspondence course.

* How "pathogens" enter water systems.
* What is "contaminated water"?
* Dissolving solids and dissolved solids or "hardness".
* Sequestering agents, other softening measures and polyphosphates.
* Emphasizes troubleshooting skills and procedures, such as:

  Desalination
  Distillation
  Tastes and Odors
  Floridation
  Chlorination

* The course is extended to the members of the above association only.

THE NUCLEAR MEDICINE TECHNOLOGY CERTIFICATION BOARD (NMTCB)

PROGRAM TITLE: Nuclear Medicine Technologist Certification

CONTACT: Mrs. Margaret Glos
Executive Director
The Society of Nuclear Medicine
475 Park Avenue South - 15th Floor
New York, New York 10016

I. General Summary

The Nuclear Medicine Technology Certification Board (NMTCB) was founded in 1977 to assess the skills and behaviors necessary for competent performance as a Nuclear Medicine Technologist, and to develop an assessment tool to measure competency in the field of Nuclear Medicine. The NMTCB assessed the skill areas, and conducted a comprehensive task analysis, prior to the development of a written certification examination. The examination is produced and administered through the cooperative efforts of the NMTCB and the American College Testing Program.

To be eligible for examination and certification a candidate must:

1. Be a high school graduate or equivalent.
2. Show documented evidence of one of the following:
    a) Graduation from an AMA accredited school of Nuclear Medicine Technology;
    b) Three years full-time clinical experience in Nuclear Medicine Technology under the supervision of a certified Nuclear Medicine Technologist and a physician licensed for the use of radionuclides, if the applicant has one of the following: 1) a Baccalaureate or Associate Degree in one of the physical or biological sciences; 2) certification in Medical Technology (M.T.); 3) certification in Radiologic Technology (R.T.); or 4) an R.N. certification;
    c) Six years full-time clinical experience in Nuclear Medicine Technology under the supervision of a certified NMT and a physician licensed for the use of radionuclides.

Implicit in the general and specific training requirements is the knowledge and application of safety techniques when dealing with radioactive materials.

Upon successful completion of the examination, applicants will be issued a certificate from the NMTCB, and will have the right to use the title, "Certified Nuclear Medicine Technologist", and its abbreviation, "CNMT".

PROGRAM TITLE: Cement Chemists Seminar

CONTACT: Mr. Edward L. Kawala, Director
Educational Services
Research and Development
Construction Technology Labs
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

During this three-day seminar held once every two years, approximately 100 cement chemists from all over North America gather to learn the newest developments in their field. The content of the seminar is highly technical, covering a variety of topics concerning all aspects of cement manufacturing. Many of the attendees return every two years as a means of keeping current in their field. Meeting changing pollution standards, increasing production while holding constant or cutting costs, and improved evaluations methods are just a few of the discussion topics.

II. Program Highlights

There are several opportunities during the three-day session to discuss energy conservation within the industry. Some of the topics include:

* Opportunities for Improvements in Energy Utilization in the Cement Industry
* Slurry Thinners--Economics in Wet Process Manufacturing
* Variations in Energy Requirements with Mineralogy and Composition of Raw Materials
* Determination of Heat Requirements for Clinkering by Differential Thermal Analyses
* The Potential Promise, Prospects, and Pitfalls in Energy Conservation in the U.S. Cement Industry

PROGRAM TITLE: Fundamentals of Occupational Noise and Dust Monitoring

CONTACT: Mr. James A. Hickey, Director
Occupational Safety and Health Services
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

This two-day training course on dust and noise sampling has several objectives. The participants learn about:

* government requirements,
* the effect of excessive exposure to noise and dust,
* what sampling equipment to use,
* how to use and maintain the equipment,
* how to sample,
* how to plan and conduct a survey,
* how to interpret the results and what to record.

Upon completion of the course, the participant will be prepared to conduct noise and dust surveys in a plant or quarry. Approximately 50 people are enrolled in the program annually.

II. Program Highlights

There are sixteen topics which are included in the course outline. A few of those topics follow as a sample of the nature of the seminar:

* Portland Cement Association Occupational Health Program - Objectives
* Cement Plant Dust - Sources, Types and Control
* Dust Regulations
* The Dust Survey
* Physics of Sound - "What is Noise"?
* Noise Regulations
* The Noise Survey

PROGRAM TITLE: Kiln Optimization Short Course

CONTACT: Mr. Edward L. Kawala, Director
Educational Services
Research and Development
Construction Technology Labs
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

This five-day seminar is specifically designed for company personnel who are responsible for the supervision or operation of the kiln. The stated objective is to familiarize participants with the principles of optimum kiln operation consistent with personnel safety, product quality and energy efficiency.

Precourse study material is sent to all participants to prepare them for class sessions. The program follows the manufacturing process for Portland Cement, starting with raw material considerations of mineralogy and composition and follows through the complete kiln cycle. This includes sessions concerning equipment, operation and material characteristics involved at the feed end of the kiln, the calcining zone, the clinkering zone, and the cooling zone. Heat recuperation, preheaters, fuel types, coatings, clinker granulometry, and dust collectors are some of the subjects discussed. All discussions are related to the practical aspects of cement-producing systems and conservation of energy consistent with product quality.

II. Program Highlights

The essence of this course is energy conservation and the efficient use of energy in this most energy-intensive aspect of the cement manufacturing.

Most of these topics are presented by members of the Basic Research Department of PCA. Statistical data is shown which has resulted from the research efforts involved.

PROGRAM TITLE: Level I Inspection Technician (Nuclear)
Level II Inspector (Nuclear)

CONTACT: Mr. Edward L. Kawala, Director
Educational Services
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

The objective for the Level I training program is to qualify beginning level concrete inspection and testing personnel for certification by training and examination. The Level II program objectives are to provide the training requirements for: 1) batching and placement inspector; 2) preplacement inspector; and, 3) prestressing systems inspector; and to qualify Level I personnel for certification.

Each of these programs is scheduled for five days and results in the awarding of Continuing Education Units as well as a Certificate of Achievement. The Level I and II programs are designed for utilities personnel, testing agencies, material suppliers, fabricators and constructors.

The Level I topics include: Laboratory and Field Tests, Quality Control Procedures, Reinforcing Steel and Prestressed Concrete and Strength Testing of Concrete. Several of the topics covered in the Level II program include: Concrete Placement, Testing of Concrete, Absolute Volume Mix Design and a Prestressing Demonstration.

II. Program Highlights

* The faculty of each of these programs have experience in concrete technology and construction and nuclear construction.

* Both programs have been recommended by the American Council on Education for college degree credit.

* CEUs are awarded for participation in this program.

* Program approved for college credit by American Council on Education.

PROGRAM TITLE: Mill Grinding Short Course

CONTACT: Mr. Edward L. Kawala, Director
Educational Services
Research and Development
Construction Technology Labs
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

This four-day program has been developed in cooperation with the four major cement equipment suppliers: Allis-Chalmers, Fuller, Polysius and F. L. Smidth. It is intended to provide participants with information that will help them understand, and more effectively operate, their grinding circuits with regard to product quality, energy efficiency and personnel safety. This short course is directed toward cement plant supervisory personnel. Certificates of completion, as well as 2.2 CEUs, are awarded for successful completion of this course.

II. Program Highlights

The emphasis in much of the course is on "optimization" of existing systems, whether wet or dry process--raw material grinding, or on finish grinding. Dust collection is discussed in several papers with regard to methods and safety. New developments in the industry are described in some detail by one of the cement equipment suppliers.

PROGRAM TITLE: Pollution Control Short Courses

CONTACT: Mr. Edward L. Kawala, Director
Educational Services
Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076

I. General Summary

This five-day short course is divided into segments which cover the broad topics related to pollution:

- Air and Water Regulations
- Economics of Dust Control and Collection
- Kiln Exit Gas Control
- Clinker Coolers - Dust Control
- Dust and Air Pollutants
- Water and Noise Pollution

Each segment takes approximately one day to complete and includes group discussions and questions as well as panel discussions including all of the speakers.

The program is designed to give a comprehensive view of environmental matters related to cement manufacturing including: regulations, rule-making, equipment and prevention procedures. Generally, the course participants include plant engineers, process engineers and others concerned with pollution control in the manufacture of cement.

Instructors for this short course have been recruited from equipment manufacturers, consultants, governmental agencies, the cement industry and the association.

II. Program Highlights

- The uniqueness stems from the fact that this program brings together so many types of professionals from all over the country.

- The value of the program lies in the participants themselves and their shared experiences during the five days.

* Portland Cement Association has its educational facilities on the 40 acre campus of the Cement and Concrete Center. Most training sessions are conducted here using the latest audiovisual teaching equipment.

* CEUs are awarded for participation in this program.

* The program is approved for college credit by American Council on Education.

PROGRAM TITLE: Chemical Waste Treatment

CONTACT: Mr. Edward J. Goss
Engineering Design and Planning
Technical In-Plant Training Department
Pratt and Whitney Aircraft Group
East Hartford, Connecticut 06108

I. General Summary

This Technical Training Program is conducted and scheduled over fifteen four-hour sessions (60 hours total) for treatment plant operators. Some of the topics covered are:

* Basic Atomic Theory
  Chemical Laws
  Modern Atomic Theory
  Isotopes

* Symbols and Formulae
  Equations
  Valence, Oxidation Number and Nomenclature

* Oxygen and Hydrogen
  Preparation and Properties of Hydrogen
  Preparation and Properties of Oxygen

* Water and Hydrogen Peroxide
  Treatment of Natural Water
  Water as a Standard
  Polar Character of Water
  Hydrates
  Heavy Water
  Hydrogen Peroxide

* Solutions

* Acids, Bases and Salts

* Chemical Reaction Rates
  Effects of Temperature, Light, a Catalyst
    and Concentration

* Waste Treatment Plant Operation
  Concentrated Waste Treatment Plant
  Dilute Waste Treatment Plant

The purpose of this program is to provide treatment plant operator training for neutralizing, diluting, pumping and otherwise processing various chemical wastes to render them harmless for final disposal.

Graduates: Plant Engineering Group of the Manufacturing Department.

SCOTT PAPER COMPANY

PROGRAM TITLE: Project DIET (A Decrease In Energy Today)

CONTACT: Mr. Nicholas J. Lardieri
Staff Vice President
Environmental Resources
Scott Paper Company
Scott Plaza
Philadelphia, Pennsylvania 19113

I. General Summary

Project DIET is Scott Paper Company's response to the energy "crunch". The goal is to decrease energy usage immediately. All Scott employees are asked to go on an "energy diet" by reducing energy consumption whenever and wherever possible. "I'm DIETing" buttons are worn proudly by participants. Scott wants each of the 20,000 employees to work together to conserve energy.

A cleverly illustrated brochure describing project DIET asks and answers some crucial questions about energy:

* What exactly is energy?
* Where does it come from?
* How important is it to me?
* How much energy is left in the world?
* Just how much has consumption increased?
* What has caused the energy crisis?
* Is population growth a real problem?
* You talked about machine growth. Is my car part of that problem?
* How is Scott Paper affected by the crisis?
* Just how much will the company spend on energy annually?
* How does that compare to profits?
* What are our basic energy objectives?
* What are our energy saving goals?
* How can you help?

This energy pamphlet is used in conjunction with a slide, film presentation given at Scott manufacturing and administrative facilities.

II. Program Highlights

It is important to note that the effort to reduce energy consumption is part of a centralized corporate environmental control program. The Corporate Environmental Resources Department is responsible for the implementation of Scott's Environmental Improvement policy. The booklet of that title details specific control programs at each plant and presents the corporate policy for the environment.

TEXACO

PROGRAM TITLE: Oil Spill Organization, Clean-up and Control

CONTACT: Mr. Norman D. Carter
Environmental Protection
Texaco
P.O. Box 509
Beacon, New York 12508

I. General Summary

Texaco's Refining Department conducts ongoing training programs at each of its refineries, worldwide, on air, noise, solid waste and wastewater treatment. The Exploration and Production, Marine, Pipeland and Marketing Departments also conduct various training programs in this area as well as safety seminars.

One of Texaco's more important programs has been a series of four to five day sessions on oil spill prevention and control and wastewater pollution control. These training programs have been held for oil industry representatives and governmental agencies in Charleston, South Carolina; Cincinnati, Ohio; Huntington, West Virginia; Venezuela and Europe. Each attendee has been provided with a comprehensive "Oil Spill Organization, Cleanup and Control Manual."

In 1972 Texaco established a worldwide oil spill response plan and they have instituted continuing training programs for their employees as a part of this plan. In the United States, Texaco has a major environmental response team in the East, West and South portions of the country. Recently an on-scene commanders training seminar and drill was conducted in Houston, Texas. Participants included the United States Coast Guard National Response Teams and the Federal Environmental Protection Agency (Dallas).

PROGRAM TITLE: Oil Spill Response Training

CONTACT: Mr. Norman D. Carter
Environmental Protection
Texaco and NUS Corporation
P.O. Box 509
Beacon, New York 12508

I. General Summary

This video training program is being developed by Texaco and the NUS Corporation of Rockville, Maryland. The program is applicable for the personnel of:

* American Petroleum Institute
* Environmental Protection Agency
* U.S. Coast Guard
* Oil Companies
* Major Oil Users
* State and Local Pollution Control Agencies
* Marine Transportation Companies
* Educational Institutions

The Oil Spill Response Training Program provides the vital training for personnel covering:

* Prevention of oil spills
* Immediate response of local personnel such as shipboard and terminal operators to the spill
* Back-up action of the Regional Response Team

The program permits initial training of a Response Team, refresher training of more experienced personnel, and the training of replacement personnel with Response Team duties.

This program is based upon instructional materials developed over the past several years by Texaco, and is now offered by Texaco and NUS to both private companies and public agencies charged with the responsibility of responding to oil spills.

The program consists of two phases. Phase I is the Organization and Operation of the Regional Response Team. It includes a color videotape/workbook program covering topics crucial to the organization and operation of a Regional Response Team. Phase II is a Simulated Oil Spill Drill.

PROGRAM TITLE: The Westinghouse International School for Environmental Management

CONTACT: Dr. James H. Wright, President
Energy Impact Associates
(formerly Westinghouse Environmental Systems Department)
P.O. Box 1899
Pittsburgh, Pennsylvania 15230

I. General Summary

Common themes throughout each of the eight sessions (from 1969 to 1977) of the Westinghouse International School for Environmental Management have emphasized technical skills and applications of environmental sciences, environmental management techniques and environmental regulations. Within this framework, however, the program varies in order to present the state-of-the-art of environmental analyses for assessing environmental implications of future energy systems. The main goal of the program is to instruct participants in technological and legal aspects of environmental management.

From the United States and many foreign countries, the participants are key decision-making personnel responsible for environmental management representing electric utilities, power-generating industrials, government agencies, academic institutions, and legal professions. Participation is limited to about thirty-five each year.

The International School for Environmental Management consists of two weeks (120 hours) of classroom presentations, field exercises, case studies and laboratory work. Lecturers include experts from the Energy Impact Associates' staff, as well as qualified professionals from related disciplines such as regulatory agencies, utilities and academic institutions. Textbooks, study guides and notes are provided as reference materials for the participants. Classroom presentations often include use of various media such as slides or overhead transparencies. Field exercises are conducted in the surroundings of Colorado State University at Ft. Collins where the school is held each year.

II. Program Highlights

* In 1974, Power magazine recognized the School's contribution for environmental leadership by awarding its 1974 Environmental Award to Westinghouse Electric Corporation for this endeavor.

* The broad scope of the program can be examined by a review of the topics presented during the 1977 session. The curricula (listed below) focused on current and future environmental issues and is representative of previous years' programs.

* Techniques of Management

- Problem Solving
- Management Grid
- Decision Analysis
- Cost/Benefit Analysis
- Applied Environmental Management
- Environmental Program Planning
- Information Retrieval

* Environmental Science

- Socioeconomic Modeling and Human Impact Assessment
- Sociocultural Impact Assessments
- Management of Social Impact
- Plant Siting
- Aquatic, Meteorological and Terrestrial Ecology
    1) Priority Pollutants; BPT/BAT, NPDES
    2) Air and Water Pollution Control Equipment
    3) Visibility; Sulfates/Nitrates
    4) Mine Reclamation
    5) Corridor Impacts
    6) Endangered Species
- Predictive Impact Assessment
- Computer Modeling of Stack Emissions Under Varied Meteorological Conditions
- Considerations Regarding Chemical Discharges

* Environmental Regulations

- National Environmental Policy Act
- Water Pollution Control Act Amendments of 1972
- Clean Air Act
- Important Court Decisions
- Trends in Regulations
- Legal Strategy Development

- Witness Guidelines
- Federal Regulatory Process
- Terrestrial Regulations

* International Issues

- Nuclear Proliferation
- Resource Availability

* Emerging Issues

- Health Effects
- Conservation
- The Department of Energy
- Industrial Concerns
- Federal Directions

PROGRAM TITLE: Basic Radiological Health

CONTACT: Mr. John G. Robinson, Manager
Environmental Engineering Department
Yankee Atomic Electric Company
(University of Lowell)
20 Turnpike Road
Westborough, Massachusetts 01581

I. General Summary

Yankee Atomic Electric Company is the recipient of this training program, Basic Radiological Health, conducted for them by the faculty of the University of Lowell.

Purpose - The two-week intensive Basic Radiological Health Course is designed to provide individuals with the fundamentals of radiological sciences and protection/health physics. It is of interest to persons entering these professions, to persons currently working in the field who have little or no formal training in the fundamentals, and to professionals in the field who desire refresher training.

Scope - The course includes a review of basic mathematics; review of physics, units, quantities, and dimensions; introduction to atomic and nuclear physics; natural and artificial radioactivity including fission and fusion; interaction of radiation with matter; radiation quantities and units; shielding; internal radiation dosimetry; biological effects of radiation; radiation protection standards and regulations; principles of radiation detection and detection devices; counting systems and assay of alpha, beta, and gamma emitters; survey and monitoring equipment; external radiation exposure and protection techniques; and radiation safety and control.

Objectives - Upon completion of the course, the participant will have developed:

1) An understanding of the fundamentals of radiological sciences and protection/health physics, and a broad overview of these disciplines.

2) Knowledge of the relationship of the fundamentals to radiation quantities and units, detection, protection, and radiation effects on biological and physical systems.

3) Familiarity with radiation detection instrumentation and procedures characteristic of current techniques.

4) A perspective on the risks involved with the uses of radioactive materials, radiation, and nuclear energy, along with an understanding of the philosophy of and technical basis for radiation standards, regulations, and protective action guides applicable to nuclear emergencies.

5) Specific skills in the areas of radiation detection and measurement, hazard assessment, and protection requirements.

6) Incentive for further professional development through future study of extensive reference materials and detailed course manual provided during the course.

Basically, the five environmental engineers from the company attended this session. It was held over a seven-month period, two sessions per month and home study.

YANKEE ATOMIC ELECTRIC COMPANY
(University of Lowell)

PROGRAM TITLE: Health Physics Certification Review
(University of Lowell)

CONTACT: Mr. John G. Robinson, Manager
Environmental Engineering Department
Yankee Atomic Electric Company
(University of Lowell)
20 Turnpike Road
Westborough, Massachusetts 01581

I. General Summary

These courses were conducted for Yankee Atomic Electric Company by the faculty of the University of Lowell. Purpose: The one-week intensive Health Physics Certification Review course is designed to help prepare participants, who have a thorough understanding of the fundamentals, for the American Board of Health Physics (ABHP) exam. In addition, it may be used by diplomats to identify their own strengths and weaknesses, to further develop their skills by the application of fundamentals in the solution of specific problems, to learn current methods and procedures used in the evaluation and control of radiation hazards in various health physics specialities, and to expand their awareness of an involvement in the broad areas of concern in the radiation protection field.

During the course, the four preparatory exams will be thoroughly reviewed and a fifth exam given to evaluate each participant's progress and areas requiring further study. In addition, informal evening discussions will be devoted to the various health physics specialties of the participants and broad areas of concern in the radiation protection field (e.g., public information, emergency response, and current methods, procedures and equipment for the evaluation and control of radiological hazards).

Summary information on the activities and recommendations of various regulatory and standard setting organizations (ICRP, ICRU, NCRP, NRC, EPA, BRH, ERDA, IAEA, etc.), answers to Part I and Part II questions in each of the five exams, detailed study outlines for each of the twenty-five subject categories in Part I, and other handouts are provided to each participant.

Part I of each exam consists of 150 multiple-choice or short answer type questions intended to test understanding of the fundamentals of radiological sciences and protection/health physics. Each question is numbered according to its location in a file according to 1 of 25 separate subject categories. Answers are provided to these questions so that participants may identify subjects requiring further study prior to the course. In order to reinforce the fundamentals covered in Part I, participants planning to take only Part I of the ABHP exam should also, however, attempt to answer questions in Part II.

Part II of each exam consists of 16 questions relating to technical evaluations and professional judgement in six health physics specialties as well as in a miscellaneous category underlying all health physics areas (e.g., dosimetry, shielding, emergency response, detection, air sampling and anlysis, and public information). In taking each of the preparatory exams, participants should try to answer any seven of these questions in the allotted time of 4 hours as required in the ABHP exam. By taking each preparatory exam as if it were the actual ABHP exam, participants will hopefully develop the psychological situation and environment typical of the actual exam, will develop confidence and skill so that their actual exam results may reflect their true level of professional development, and will be able to evaluate their level of preparation so that they may identify subjects requiring further study. In preparing for the ABHP exam and the one week review course, participants should, in addition, answer as many Part II questions as time allows.

Photo reprinted from the
Michigan Technological
University Catalog 1975-76

PROJECT COMMENTARY

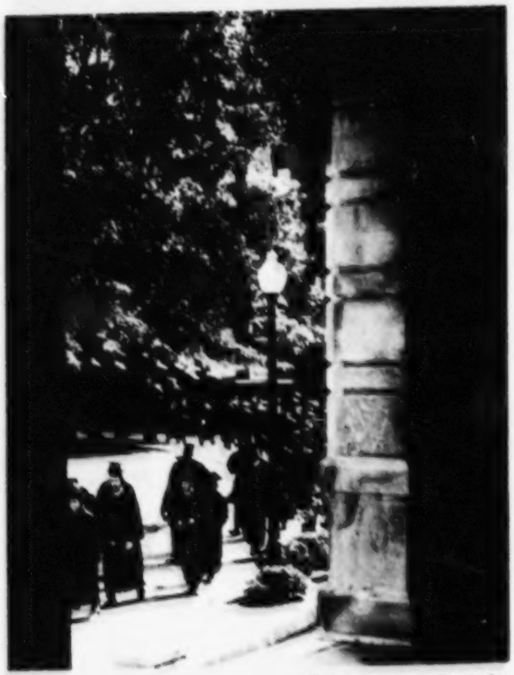


Photo reprinted from the
University of Missouri,
Columbia Bulletin 1977

PROJECT COMMENTARY

The results of this survey of a sample of training programs conducted in the private sector are both encouraging and discouraging. The encouraging aspects tend to center around the genuine effort and interest demonstrated in the design and implementation of these programs. The Gulf seminar, A Bad Day at Bunker Point, contradicts public impressions about the possible complacency of oil company executives and oil terminal managers. Participants engaged in role-playing exercises which are simultaneously video taped and then critiqued by the team members must at least gain some degree of awareness about both the environmental ramifications and the public's reactions to oil spills.

Minnesota Mining and Manufacturing, 3M, encourages all laboratory, manufacturing and engineering employees to design pollution out of their process or product development. Their statistics as a result of this program are extremely encouraging and certainly impressive.

Energy conservation programs such as those at 3M, Scott Paper and W. R. Grace are company-wide and focus on a significant problem facing the nation today. These programs are on-going rather than specific short term responses to an energy crisis viewed by some as temporary.

The magnitude of the training efforts of Portland Cement Association and the American Public Works Association documents their firm commitment to training and upgrading the knowledge and skills of their membership.

The tremendous amount of materials including pamphlets, films, filmstrips, audio and video tapes, brochures and other publications, prepared and distributed by the Asbestos Information Association/North America and the Automotive Dismantlers and Recyclers of America is indicative of their interest in pollution-related problems.

On an international scale, the Westinghouse International School for Environmental Management, addresses issues like the environmental implications of future energy systems. Participants are specially selected from both the United States and foreign countries.

Numerous training programs are geared to the teaching of specific techniques and skills necessary to either refresh or upgrade performance on the job. The American Industrial Hygiene Association programs on toxicology fall into this category as do the Consolidated Papers, Inc. program for wastewater treatment plant operators and The Institute of Paper Chemistry microbiology programs. Many other programs are designed around very specific information or skills related to the environment and pollution.

These examples represent only a few of the organizations included in this report. But they alert the reader to the scope of such training. In the private sector survey at least, training encompasses specific skills and information, environmental awareness, global issues, resource conservation, health hazards, computer modelling, emergency preparedness, current environmental issues and regulations as well as new technology. The recipients of this training are primarily employed by the private sector but in several cases include high school students (Arkansas Power and Light) and the community at large (Duquesne Light Company). The cost of this training is borne by industry alone whether supported on an in-house basis or purchased from consulting firms or associations.

These training programs obviously were developed in order to meet a need. That need may have resulted from the passage of new legislation concerning environmental standards, the discovery/invention of new techniques in a specific field, the emphasis on conservation due to the energy shortage, the increased risk of pollution due to greater production and transportation capacities or in response to hundreds of other needs. The point is that a need for training was and is perceived and therefore industry has seen fit to commit a portion of its financial and personnel resources to meet that need. This commitment is another of the encouraging aspects of this survey. Whether it is enough and appropriately focused is a subject for speculation now and into the future. Certainly the response and cooperation enjoyed during the course of this survey is encouraging since it is an indication of the pride felt by these organizations in their training efforts to date. Most, if not all, organizations were anxious for their story to be told.

The discouraging aspects of this survey tended to center around the issues of academic environmental training, its relevance to employment in the private sector and the divergence of opinion regarding pre and post employment training.

During the course of the telephone interviews, organizations were asked if they hire graduates of environmental programs. Some organizations responded that they routinely hire environmental program graduates to fill a variety of positions. Others were adamant that they would not hire an environmental program graduate for a number of reasons. One of the reasons mentioned most frequently for not hiring the environmental graduate was that a "specialist" was needed rather than a "generalist". This debate rages even over the use of such terms.

Many people interviewed associated the specialist with a degree major in biology, chemistry, engineering (i.e., nuclear, petroleum, chemical, acoustical), geology, toxicology, microbiology and the like. Whereas, a generalist was often associated with environmental studies or even environmental engineering programs, although many agreed that such a graduate often had a major in a specific environmental area such as air or water.

Many organizations stated that they only hire the specialists, then retrain them in the specific environmental issues and concerns of the organization. The rationale seems to be that if a person has a strong background in a specific field then he/she can be easily oriented to the environmental ramifications associated with that field, through on-the-job training, in-house training and outside professional seminars. Those organizations generally amenable to hiring the environmental program graduate also indicated the desire to retrain or at least orient the newly hired graduate to the specifics of their organizations. Another segment of the sample chose to transfer current employees and retrain them in environmental issues, rather than hire new employees at all.

A very significant pattern may be emerging from this sample regarding the types of organizations in the private sector who tend to hire environmental graduates and those who hire only science majors or engineers. According to one person interviewed "the steel companies may hire the environmental types with concentrations in Air Quality for example; small industries may indeed hire the specialist and train him/her in the environmental concerns of the industry; utilities and environmental consulting firms will hire both the specialist and the generalist for different levels of positions." It would be interesting if such a pattern were documented in a study. The other piece of this pattern is certainly the types of positions for which these people are hired. No real data emerged related to this pattern. But further analysis could lead to a structure inherent in the private sector which would prove extremely valuable to prospective environmental graduates.

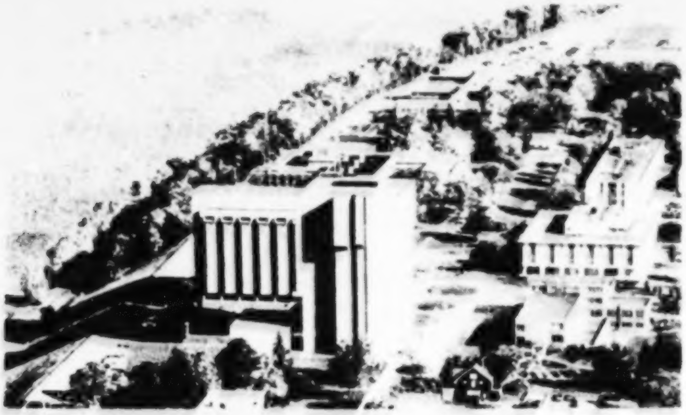


Photo reprinted from the Michigan Technological University Catalog 1975-76

APPENDICES

Photo reprinted from the University of Illinois Institute of Technology Booklet

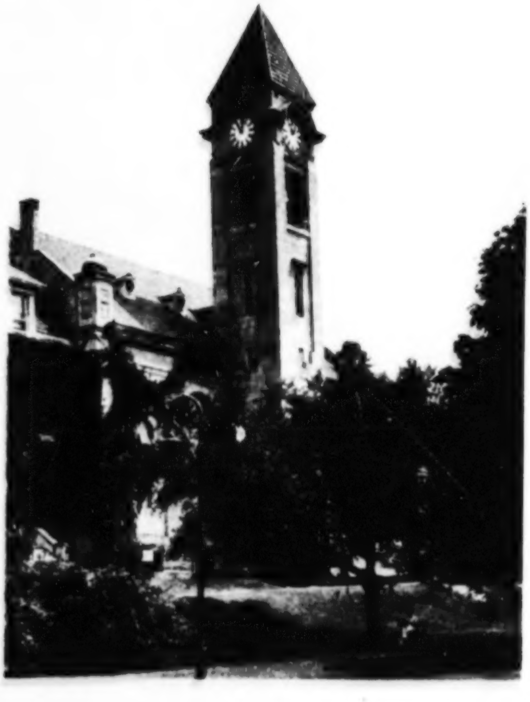


Photo reprinted from the Indiana University of Public and Environmental Affairs Catalog 1977-78

APPENDIX I

PARTICIPATING ORGANIZATIONS

Business and Industry

Abbott Laboratories
Abbott Park
North Chicago, Illinois 60064
*David Schwarz

American Electric Power Service Corporation
2 Broadway
New York City, New York 10004
*John Tillinghast

AMOCO
Standard Oil of Indiana
200 E. Randolph Drive
Chicago, Illinois 60601
*Russell Mallatt

Anatrol Corporation
11305 Reed Hartman Highway
Suite 227
Cincinnati, Ohio 45241
*Tony Shipley

O. L. Angevine & Associates
7661 Seneca Street
East Aurora, New York 14052
*O. L. Angevine

Arkansas Power & Light Company
Capital and Broadway Streets
Little Rock, Arkansas 72201
*Bill Coleman

Armco Steel Corporation
703 Curtis Street
Middletown, Ohio 45042
*John Barker

AVCO Corporation
1275 King Street
Greenwich, Connecticut 06830
*Dr. Dorothy Simon

Bethlehem Steel Corporation
Bethlehem, Pennsylvania 18016
*J. V. Robertson

Boeing Company
7755 E. Marginal Way, S.
Seattle, Washington 98124
*Gene Maulbetsch

Borg-Warner Corporation
200 S. Michigan Avenue
Chicago, Illinois 60604
*Don Robinson

Chevron Chemical Company
575 Market Street
San Francisco, California 94105
*Tim Hubbard

Chevron Oil Company
225 Bush Street
San Francisco, California 94104
*Bill Leek

Columbus & Southern Ohio Electric Company
215 N. Front Street
Columbus, Ohio 43215
*Henry L. Schulte, Jr.

Connecticut Yankee Atomic Power
107 Selden Street
Berlin, Connecticut 06037
*D. C. Switzer

Consolidated Edison Company (NY)
4 Irving Place
New York City, New York 10003
*Dr. Peter Freudenthal

Consolidated Papers, Inc.
231 First Avenue, N.
Wisconsin Rapids, Wisconsin 54494
*Dan Meyer

CPC International
International Plaza
Englewood Cliffs, New Jersey 07632
*Mr. Williams

Dallas Power & Light Company
1506 Commerce Street
Dallas, Texas 75201
*R. W. Cox

Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219
*Steve Pernik

Ekono, Inc.
410 Bellevue Way, S.E.
Bellevue, Washington 98004
*David Lutrick

Esmark, Inc.
55 E. Monroe Street
Chicago, Illinois 60603
*Donald P. Kelly

Fairchild Industries, Inc.
10301 Century Boulevard
Germantown, Maryland 20767
*John J. Faherty

Georgia-Pacific Corporation
900 S.W. 5th Street
Portland, Oregon 97204
*Matthew Gould

B. F. Goodrich & Company
500 S. Main Street
Akron, Ohio 44318
*Roger Strassburg

W. R. Grace and Company
1114 Avenue of Americas
New York City, New York 10036
*George Blackwood

Grumman American Aviation
Corporation
P.O. Box 2206
Savannah, Georgia 31402
*Bert Biezenbos

Gulf Science and Technology
P.O. Box 2038
Pittsburgh, Pennsylvania 15230
*William Zarrella

Hoffman Electronics Corporation
4323 Arden Drive
El Monte, California 91734
*Melvin W. Caquelin

Industrial Pollution Control, Inc.
45 Riverside Avenue
Westport, Connecticut 06880
*Ken Lanouette

Inland Steel Company
30 W. Monroe Street
Chicago, Illinois 60603
*J. Daniel Ray

Johns-Manville International
Corporation
Ken-Caryl Ranch
Denver, Colorado 80217
*D. E. Hillier

Kaiser Cement & Gypsum Corporation
300 Lakeside Drive
Oakland, California 94666
*None specified

Lockheed Aircraft Corporation
2555 N. Hollywood Way
Burbank, California
*Fred Reed

McCulloch Oil Corporation
10880 Wilshire Boulevard
Los Angeles, California 90024
*Rollin Russell

Middle South Utilities, Inc.
225 Baronne Street
New Orleans, Louisiana 70161
*Joel Patterson

Minnesota, Mining & Manufacturing
(3M)
3M Center
St. Paul, Minnesota 55101
*Henry Owen

Mobil Oil Corporation
150 E. 42nd Street
New York City, New York 10016
*D. P. Heath

Harold R. Mull, Bell & Associates
181 Main Street
Norwalk, Connecticut 06851
*Lewis Bell

North American Philips Corporation
100 E. 42nd Street
New York City, New York 10017
*Albert Ruttner

NUS Corporation
4 Research Place
Rockville, Maryland 20850
*Don Burd

Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106
*James McCollum

PCI Ozone Corporation
One Fairfield Crescent
W. Caldwell, New Jersey 07006
*Carl Nebel

Pittston Company
One Pickwick Plaza
Greenwich, Connecticut 06830
*Douglas T. Johnston

Potomac Electric Power Company
1900 Pennsylvania Avenue, N.W.
Washington, DC 20068
*Susan H. Power

Quaker Oats Company
Merchandise Mart Plaza
Chicago, Illinois 60654
*John E. Mutchler

Republic Steel Corporation
25 W. Prospect Avenue
Cleveland, Ohio 44101
*Glen Johnson

Research Cottrell
P.O. Box 750
Bound Brook, New Jersey 08805
*Mike Smith

R. J. Reynolds Industries, Inc.
401 N. Main Street
Winston-Salem, North Carolina 27102
*Marshall Miller

San Diego Gas and Electric Company
Box 1831
San Diego, California 92101
*R. G. Lacy

Scott Paper Company
Scott Plaza
Philadelphia, Pennsylvania 19113
*Nicholas J. Lardieri

Signal Companies, Inc.
9665 Wilshire Boulevard
Beverly Hills, California 90212
*E. E. McLin

SOHIO Petroleum Company, Inc.
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115
*Bruce McCrodden

St. Regis Paper Company
150 E. 42nd Street
New York City, New York 10017
*Arthur C. Veverka

Texaco, Inc.
Box 509
Beacon, New York 12508
*Norm Carter

Textron, Inc.
40 Westminster Street
Providence, Rhode Island 02903
*Robert S. Eisenhauer

Union Electric Company
1 Memorial Drive
St. Louis, Missouri 63102
*Eugene F. Cerulo

United Technologies Corporation
(Pratt Whitney Aircraft Group)
United Technologies Building
Hartford, Connecticut 06101
*Joseph Crisco, Jr.

Virginia Electric & Power Company
(VEPCO)
700 E. Granklin Street
Richmond, Virginia 23261
*Dr. Morris L. Brehmer

Waste Management, Inc.
900 Jorie Boulevard
Oakbrook, Illinois 60521
*Jane Graeffe

Western Electric Company, Inc.
222 Broadway
New York City, New York 10038
*K. E. Gennaro

Westinghouse Electric Corporation
Gateway Center
Pittsburgh, Pennsylvania 15222
*Dr. James Wright

Yankee Atomic Electric Company
20 Turnpike Road
Westboro, Massachusetts 01581
*John Robinson

Trade and Professional Associations

Air Pollution Control Association
4400 Fifth Avenue
Pittsburgh, Pennsylvania 15213
*Lewis H. Rogers

American Academy of Environmental Engineers
Box 1278
Rockville, Maryland 20850
*George Hannah

American Association of Small Research Companies
8794 West Chester Pike
Upper Darby, Pennsylvania 19082
*S. D. Lovejoy

American Chemical Society
1155 16th Street, N.W.
Washington, DC 20036
*Moses Passer

American Conference of Governmental Industrial Hygienists
P.O. Box 1937
Cincinnati, Ohio 45201
*William D. Kelley

American Forest Institute
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
*George C. Cheek

American Industrial Hygiene Association
66 S. Miller Road
Akron, Ohio 44313
*Larry Hyde

American Institute of Chemical Engineers
345 E. 47th Street
New York City, New York 10017
*Harold Abramson

American Institute of Fishery Research Biologists
1226 Skyline Drive
Edmonds, Washington 98020
*F. Heward Bell

American Institute of Plant Engineers
1021 Delta Avenue
Cincinnati, Ohio 45208
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American Nuclear Energy Council
1750 K Street, N.W.
Washington, DC 20006
*Gene Haues

American Nuclear Society, Inc.
555 N. Kensington Avenue
LaGrange, Illinois 60525
*None specified

American Paper Institute, Inc.
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
*C. Richard Calkins

American Public Works Association
Education Foundation
1313 E. 60th Street
Chicago, Illinois 60637
*Malcolm C. Van Deursen

American Pulpwood Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
*A. W. Wimble

American Society of Agronomy
677 S. Segol Road
Madison, Wisconsin 53711
*Matthias Stelly

American Society of Radiologic
Technologists
500 N. Michigan Avenue
Suite 836
Chicago, Illinois 60611
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American Textile Manufacturers
Institute, Inc.
Wachovia Center
400 S. Tryon Street
Charlotte, North Carolina 28285
*O'Jay Niles

American Water Resources Association
St. Anthony Falls Hydraulics Lab
Third Avenue, S.E.
Minneapolis, Minnesota 55414
*Dana C. Rhoads

American Wood Council
1619 Massachusetts Avenue, N.W.
Washington, DC 20036
*Carl E. Darrow

American Wood Preservers Bureau
2772 S. Randolph Street
Box 6085
Arlington, Virginia 22206
*William Dost

Asbestos Information Association/
North America
1745 Jefferson Davis Highway
Arlington, Virginia 22202
*B. J. Pigg

Asbestos Textile Institute, Inc.
P.O. Box 471
131 N. York Road
Willow Grove, Pennsylvania 19090
*Mrs. Doris M. Fagan

Association of American Plant
Food Control Officials, Inc.
Department of Biochemistry
Purdue University
W. Lafayette, Indiana 47907
*R. C. Rund

Association of Conservation
Engineers
Box 1028
Pratt, Kansas 67124
*Aaron J. Lane

Atomic Industrial Forum, Inc.
7101 Wisconsin Avenue
Washington, DC 20014
*E. David Harward

Automotive Dismantlers and
Recyclers of America, Inc. (ADRA)
1000 Vermont Avenue, N.W.
Washington, DC 20005
*Russell F. McKinnon

Canadian Manufacturers Association
One Yonge Street
Toronto, Ontario MSE 159
*Doug McLellan

Conference of Local Environmental
Health Administrators
Milwaukee Health Department
891 N. Broadway
Milwaukee, Wisconsin 53202
*George Kupfer

Ecological Society of America
The Evergreen State College
Olympia, Washington 98505
*Dr. Edward J. Kormondy

Environmental Management Association
1701 Drew Street, Suite 4
Clearwater, Florida 33515
*Harold C. Rowe

Industrial Research Institute
100 Park Avenue, Suite 2209
New York City, New York 10017
*Arthur Kortheuer

Institute of Noise Control
Engineering
Ray W. Herrick Laboratories
Purdue University
West Lafayette, Indiana 47907
*Malcolm J. Crocker

Institute of Paper Chemistry
1043 E. South River Street
Appleton, Wisconsin 54911
*Doug Dugal

Institute of Scrap Iron & Steel
1627 K Street, N.W.
Washington, DC 20006
*Dr. Herschel Cutler

International Association for
Pollution Control
1625 Eye Street, N.W.
Washington, DC 20006
*Robert N. Tomb

International Association of
Fish, Wildlife Agencies
1412 16th Street, N.W.
Washington, DC 20036
*John S. Gottschalk

International Solar Energy Society
c/o Florida Solar Energy Center
300 State Road 401
Cape Canaveral, Florida 32920
*Edward C. Fordyce

Manufacturing Chemists Association
1825 Connecticut Avenue, N.W.
Washington, DC 20009
*George Best

National Association of Conservation Districts
1025 Vermont Avenue, N.W.
Suite 1105
Washington, DC 20005
*Robert E. Williams

National Association of Water
Companies
Box 387
Washington, DC 20044
*Robert G. Paszkiewicz

National Coal Association
Coal Building
1130 17th Street, N.W.
Washington, DC 20036
*Betsy Kraft

National Council of Acoustical
Consultants
8811 Colesville Road, Suite 225
Silver Spring, Maryland 20910
*John P. Bachner

National Council of the Paper
Industry for Air & Stream
Improvement (NCASI)
260 Madison Avenue
New York City, New York 10016
*Isaiah Gellman

National Environmental Health
Association
1200 Lincoln, Suite 704
Denver, Colorado 80203
*Lawrence J. Krone

National Recreation & Park
Association
1601 N. Kent Street
Arlington, Virginia 22209
*Thad Studstill

National Society of Professional Engineers
2029 K Street, N.W.
Washington, DC 20006
*Paul H. Robbins

National Solid Wastes Management Association
1120 Connecticut Avenue
Suite 930
Washington, DC 20036
*Dick Hammond

National Water Well Association
500 W. Wilson Bridge Road
Worthington, Ohio 43085
*Kathy Butcher

OSMOSE Wood Preserving Company
980 Ellicott Street
Buffalo, New York 14209
*Thomas P. McGill

Pesticide Formulators Association
1629 K Street, N.W., Suite 575
Washington, DC 20006
*Robert J. Alikonis

Portland Cement Association
5420 Old Orchard Road
Skokie, Illinois 60076
*George McCord

Process Equipment Manufacturers Association
P.O. Box 8745
Kansas City, Missouri 64114
*Art Parchen

Professional Engineers in Private Practice
2029 K Street, N.W.
Washington, DC 20006
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Society for Range Management
2760 W. 5th Avenue
Denver, Colorado 80224
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Society of Mining Engineers of AIME
540 Arapeen Drive
Salt Lake City, Utah 84108
*Pat Price

Society of Nuclear Medicine
475 Park Avenue South
New York City, New York 10016
*Mrs. Margaret Glos

Soil Conservation Society of America
7515 N.E. Ankeny Road
Ankeny, Iowa 50021
*H. Wayne Pritchard

Technical Association of Pulp & Paper Industry
One Dunwoody Park
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*Carol Zippay

Zinc Institute
292 Madison Avenue
New York City, New York 10017
*Donald Lynam

APPENDIX II

ORGANIZATIONS CONTACTED

Business and Industry

Alcoa Generating Corporation
Allegheny Ludlum Industries
Allied Chemical Corporation
Allis-Chalmers Corporation
Aluminum Company of America
Amerada Hess Corporation
American Color & Chemical Corporation
American Motors
Amstar Corporation
Amstar Reginery
Ashland Oil Company
Atlantic Cement Corporation, Inc.
Atlantic Richfield Company
AVCO Corporation
Bangor Hydro-Electric Company
BASF Wyandotte Corporation
Baxter Travenol Laboratories
Black Diamond Coal Mining Company
Blaw-Knox Company
Boise Cascade Corporation
Boston Edison Company
Bro Rad Laboratories, Inc.
Burlington Industries
Centex Corporation
Champion International Corporation
CIBA-GEIGY Corporation
Cities Service Company
Clark Oil and Refining Corporation
Colorado Interstate Gas Company
Commonwealth Edison Company of Indiana
Consolidated Coal Company
Continental Oil Company
Co-operative Farm Chemical Association
Crown Zellerback Corporation
Diamond Coal Company, Inc.
Diamond Shamrock Corporation
Dow Chemical Company
Du Pont E.I. De Nemours & Company
Energy Unlimited, Ltd.
Exxon Corporation
Firestone Tire and Rubber Company
Ford Motor Company

Gates Learjet Corporation

General Dynamics Corporation

General Electric Company

General Motors Corporation

Getty Oil Company

Great Lakes Chemical Corporation

Great Northern Nekoosa Corporation

Greyhound Corporation

Gulf Resources & Chemical Corporation

Hammermill Paper Company

Hooker Chemicals & Plastic Corporation

Hydro-Air Engineering, Inc.

Ideal Basic Industries, Inc.

Indiana & Michigan Power Company

International Harvester Company

International Paper Company

Iowa-Illinois Gas & Electric Company

Iowa Southern Utilities Company

Johnstown Coal Coke Company, Inc.

Jones & Laughlin Steel Corporation

Kansas Gas & Electric Company, Inc.

Kentucky Carbon Corporation

Kimberly-Clark Corporation

Lake Hemet Municipal Water Dist.

Lehigh Portland Cement Company

Liberty Mutual Insurance Company

Lone Star Industries

LTV Corporation

Magna-Thermal Power Project

Maine Yankee Atomic Power Company

Marathon Oil Company

Marquette Company, Inc.

Martin Marietta Corporation

Massachusetts Electric Company

McDonnell Douglas Corporation

McGraw-Edison Company

Medusa Corporation

Middle South Utilities, Inc.

Midwest Steel

Monsanto Company

National Gypsum Company

National Steel Corporation

Northrop Corporation

Nuclear Engineering Company

Occidental Petroleum Corporation

Ohio Edison Company, Inc.

Ohio Power Company

Olin Corporation

Owens-Illinois, Inc.

Penn Dixie Industries, Inc.

Pennzoil Company

Peoples Gas Company

Pfizer, Inc.

Phillips Petroleum Company

Pollution Control Industries

PPG Industries, Inc.

Quaker State Oil Refining Corporation

Raychem Corporation

Rockwell International Corporation

Rohr Industries, Inc.

St. Joe Minerals Corporation

St. Joe Paper Company, Inc.

Shell Oil Company

Sherwin-Williams Company

Skelly Oil Company

South Carolina Electric & Gas Company

South Mississippi Electric Power Association

Southern California Water Company

Standard Oil Company of California

Standard Oil Company of Indiana

Standard Oil Company, Ohio Corp.

Stauffer Chemical Company

Sun Oil Company, Inc.

Teledyne, Inc.

Tenneco Corporation

Tennessee Consolidated Coal Company

Texas Utilities Company

Thompson-Hayward Chemical Company

Tri State Electric Membership

TRW, Inc.

Union Carbide Corporation

Union Oil Company of California

Union Pacific Corporation

Uniroyal, Inc.

United Nuclear Corporation

United States Radium Corporation

U. S. Steel

Vermont Yankee Nuclear Power Corporation

Virginia Electric Co-op

Waste Resources Corporation

Water and Waste Utilities Company

Water Works and Lighting Commission

Wausau Paper Mills Company

Westmoreland Coal Company

Westvaco Corporation

Weyerhaeuser Company

Wheeling-Pittsburgh Steel Corporation

Widefield Homes Water Company, Inc.

Wisconsin Electric Power Company

Trade and Professional Associations

Acoustical Society of America

American Coke & Coal Chemicals Institute

American Fisheries Society

American Forestry Association

American Gas Association

American Institute of Biological Sciences, Inc.

American Institute of Chemists, Inc.

American Iron & Steel Industries

American Lung Association

American Mosquito Control Association

American Public Health Association

American Society for Engineering Education

American Society of Biological Chemists

American Society of Certified Engineering Technicians

American Society of Civil Engineers

American Society of Limnology and Oceanography

American Society of Sanitary Engineering

American Water Works Association

American Wood Preservers Institute

Associated Laboratories

Association of Air Pollution Control Equipment Manufacturers

Association of American Pesticides Control Officials

Association of Career Training Schools

Association of Consulting Chemists and Chemical Engineers

Association of Metropolitan Sewerage Agencies

Association of State & Interstate Water Pollution Control Administrators

Better Hearing Institute

Bituminous Coal Research, Inc.

California Redwood Association

Concrete Plant Manufacturers Bureau

Conference of Public Health Laboratory Directors

Conference of State Sanitary Engineers

Congress of Lung Association Staff

Cooling Tower Institute

Edison Electric Institute

Engineers Council for Professional Development

Environmental Action Foundation

Environmental Education Group

Environmental Mutagen Society

Federal Water Quality Association

Forest Industries Council

Forest Products Research Society

Foundry Equipment Manufacturers Association

Gas Processors Association

Ground Water Council

Industrial Gas Cleaning Institute

International Association of Heat and Frost Insulators and Asbestos Work

International Association of Milk, Food and Environmental Sanitarians

International Chemical Workers Union

Institute for Municipal Engineering

Institute of Advanced Sanitation

Institute of Environmental Sciences

Institute of Nuclear Materials Management

National Agricultural Chemicals Association

National Association for Environmental Education

National Association of Government Inspectors and Quality Assurance Personnel

National Association of Recycling Industries

National Association of Regulatory Utility Commissioners

National Council on Radiation Protection and Measurement

National Lead Burning Association

National Parks and Conservation Association

National Pest Control Association

National Shellfisheries Association

National Slag Association

National Water Resources Association

National Water Supply Improvement Association

National Wildlife Federation

Natural Resources Defense Council

North American Thermal Analysis Society

Open Pit Mining Association

Portable Sanitation Association

Rachel Carson Trust for the Living Environment

Radiological Society of North America

Salt Institute

Society of Independent Professional Earth Scientists

Society of Mining Engineers of AIME

Society of Power Industry Biologists

Society of Toxicology

Soil Science Society of America

Solar Energy Industries Association

Threshold: An International Center for Environmental Renewal

Trout Unlimited

United Pesticide Formulators and Distributors Association

U.S. Conference of City Health Officers

Universities Council on Water Resources

Water and Wastewater Equipment Manufacturers

Water Pollution Control Federation

Water Quality Association

Water Resources Congress